# SPECIFICATIONS

# FOR

# CONSTRUCTION OF

# REMODELLING OF

FOIAb3b1

[redacted]

25X1A7b

[redacted]

# WITH

# APPURTENANT UTILITIES

[redacted]



May 1965

[redacted]

25X1A5a1

# TABLE OF CONTENTS

PART I

STATEMENT OF WORK

SW-01 DESCRIPTION OF WORK:

a. Work to be done: The work consists of furnishing all supervision, plant, labor, materials, equipment, supplies, transportation, including fuel, power and water (except any materials, equipment, utilities or services, if any, specified herein to be furnished by the Government) and performing the work for construction of Remodelling [redacted] 25X1A7a
25X1A6a [redacted] with all required appurtenant work, complete, in strict accordance with the specifications, schedules, drawings and conditions all for which are made a part hereof and designated as follows:

SPECIFICATION FOR CONSTRUCTION OF REMODELLING [redacted] 25X1A7a

25X1A7a [redacted] HOUSING AREA, [redacted] with APPURTENANT 25X1A6a

UTILITIES, May 1965.

Drawings are designated as follows:

| Sheet No. | Drwg. No. | Work div. | Title |
|---|---|---|---|
| 1 | A-1 | Architect. | Plans & finish schedule. |
| 2 | A-2 | " | Section, elevations; window, roof & ceiling details. |
| 3 | A-3 | " | Toilet & bathroom details. |
| 4 | A-4 | " | Door details. |
| 5 | A-5 | " | Case work & toilet stall details. |
| 6 | A-6 | " | Misc. details. |
| 7 | M-1 | Plumbing | 1st floor plan lay-out & diagrams |
| 8 | M-2 | " | Basement plan lay-out & misc. details |
| 9 | E-1 | Electr. | Lay-out plans & misc. |
| 10 | E-2 | " | Diagrams, schedules, notes, & misc. |

b. Location: The site of the work contemplated under these
25X1A7a specifications is located at [redacted] HOUSING AREA, [redacted] 25X1A6a
25X1A6a [redacted]

SW-02 PRINCIPAL FEATURES: The project includes the following principal features:

a. Construction of one public toilet, 5 bathrooms and 5 kitchenettes within the existing [redacted] building. 25X1C4a

b. Construction of new utility room facilities in existing bathroom.

c. Rehabilitation of plumbing connections to existing plumbing fixtures.

d. Construction of new roof drainage system [redacted] 25X1C4a

e. Construction of purtenatn utility connections.

The foregoing general outline of principal features does not in any way limit the responsibility of the Contractor to perform the work and furnish all supervision, plant, labor, materials, equipment, supplies, transportation, including fuel, power and water, except any materials, equipment, utilities or services, if any, specified herein to be furnished by the Government, required by the specifications, and the plans and the drawings referred to therein.

25X1A5a1

[redacted]

COST ESTIMATE

25X1A7a Project: [redacted]
Location:

Sheet 1 of 11

| No. | Description of Item | Unit | Quantity | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| 1 | Dismantling work | | | | |
| | a. Concrete | CF | | | |
| | b. 4" C.B.walls | SF | | | |
| | c. 8" C.B. walls | SF | | | |
| | d. windows | SF | | | |
| | e. Ceilings | SF | | | |
| | f. Roof drains & Down spouts | Ea | | | |
| | g. Misc. | LS | | | |
| 2 | Concrete work (incl. labor) | | | | |
| | a. Reinf. bars (incl. c.b. reinf.) | Ton | | | |
| | b. Concrete class "A" | CY | | | |
| | c. Concrete class "B" (sidewalk repairs) | CY | | | |
| | d. Welding | LS | | | |
| 3 | Concrete block work (incl. labor) | | | | |
| | a. 8" Block | Ea | | | |
| | b. 4" Block | Ea | | | |
| 4 | Roofing: | | | | |
| | a. Epoxy bonding compound | Gal | | | |
| | b. Cement mortar | CY | | | |
| | c. Epoxy mortar | CF | | | |

[redacted]

COST ESTIMATE

Project: [redacted]

5X1A7a Location:

Sheet 2 of 11

| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| | d. labor | MD | | | |
| 5 | Miscellaneous Metals: | | | | |
| | a. Susp. ceilings: | | | | |
| | (1) Galv. steel furring channels | LF | | | |
| | (2) 1½" Galv. steel channels | LF | | | |
| | (3) 1/8"x1½"x4"x1½" w. hanger clips | Ea | | | |
| | (4) 3/8" ϕ Galv. steel rods, threaded | Ea | | | |
| | (5) 3/8" ϕ Threaded studs | Ea | | | |
| | (6) 3/8" I. D. Galv. steel couplings | Ea | | | |
| | (7) labor | MD | | | |
| | b. Hollow metal stud partitions: | | | | |
| | (1) 4" steel channel studs | LF | | | |
| | (2) 4" steel channel runners | LF | | | |
| | (3) Steel shoes | Ea | | | |
| | (4) 3/4" steel channels | LF | | | |
| | (5) Labor | MD | | | |
| | c. Aluminum Louvers, | Ea | | | |
| | d. Coat hang rods, 1" I.D. Galv. pipe | LF | | | |
| | e. (1) Chrom. brass rod flanges | Ea | | | |
| | e. Misc. nails, screws, bolts, nuts | LS | | | |
| | f. Protective coatings | LS | | | |

25X1A5a1 [redacted]

25X1A7a

COST ESTIMATE

Project: [redacted]
Location:

Sheet 3 of 11

| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| 6. | Aluminum windows sash w/ screens | SF | | | |
| | (1) Installation | SF | | | |
| 7. | Carpentry | | | | |
| | a. Lumber, framing | BF | | | |
| | b. Lumber, mill work | BF | | | |
| | c. Plywood: 1" TK x 4" x 8' | Sht | | | |
| | 3/4" TK x 4' x 8' | Sht | | | |
| | ½" TK x 4' x 8' | Sht | | | |
| | 3/8" TK x 4' x8' | Sht | | | |
| | ¼" TK x 4' x 8' | Sht | | | |
| | d. Laminated plastic, 1/16" TK x 4' x 8' | Sht | | | |
| | e. Hollow-core flush door, 1 3/4" | Ea | | | |
| | " " " " 1 3/4" | Ea | | | |
| | " " " " 1 3/4" | Ea | | | |
| | f. Asbestos-cem. boards, ½" TK | SF | | | |
| | g. 2" mineral wool insulation batts | SF | | | |
| | h. Wood preservative | LS | | | |
| | i. Sand paper, putty, glue, & misc. | LS | | | |
| | j. Labor | MD | | | |
| 8. | Plaster work | | | | |
| | a. Metal lath | SF | | | |
| | b. Corner beads | LF | | | |

25X1A7a

COST ESTIMATE

Project: [redacted]
Location:

Sheet 4 of 11

| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| | c. Corner lath | LF | | | |
| | d. Tie wire | LS | | | |
| | e. Labor (lath) | MD | | | |
| | f. 3/4" plaster (incl. labor) | SF | | | |
| | g. ½" plaster (incl. labor) | SF | | | |
| 9. | Tile work, ceramic | | | | |
| | a. 4¼" x 4¼" wall tiles | SF | | | |
| | b. Steps, returns, coves, trimmers, caps | Ea | | | |
| | c. 4" x 4" Quarry tile | SF | | | |
| | d. Asphalt felt | SF | | | |
| | e. 2" x 2" mesh setting bed reinf. | SF | | | |
| | f. Mortar setting bed | CY | | | |
| | g. Expansion joint (3/8" x 1½") | LF | | | |
| | h. Labor | MD | | | |
| 10 | Acoustical tile, 3/4" x 1' x 2' | Ea | | | |
| | a. Labor | MD | | | |
| 11 | Calking: | LS | | | |
| 12 | Glazing: a. 7/32" class A, clear glass | SF | | | |
| | b. 7/32" class B, obsure glass | SF | | | |
| | c. glazing compound | LB | | | |
| | d. Labor | MD | | | |

25X1A7a

COST ESTIMATE

Project: [redacted]
Location:

Sheet 5 of 11

| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| 13. | Resilient floor tile: | | | | |
| | a. 1/8" x 9" x 9" Asph. tile (for repairs) | SF | | | |
| | b. 1/8" x 9" x 9" Vinyl asb. tile | SF | | | |
| | c. 4" vinyl base | LF | | | |
| | d. Primer & cement | Gal | | | |
| | e. Labor | MD | | | |
| 14. | Bathroom & toilet accessories. | | | | |
| | a. Coat hooks, type IV | Ea | | | |
| | b. Chrom. brass curtain rods, 5'L | Ea | | | |
| | c. Shower curtains w/ roller bearing hooks | Ea | | | |
| | d. Hook & bumper, type 4330 | Ea | | | |
| | e. Medicine cabinets, type IV | Ea | | | |
| | f. Mirrors, 18" x 24" | Ea | | | |
| | g. Paper towel CABINET, type 445 | Ea | | | |
| | h. Soap dispensers | Ea | | | |
| | i. Soap dishes, rec. | Ea | | | |
| | j. Toilet paper holders, rec. | Ea | | | |
| | k. Toilet stall accessories | | | | |
| | (1) Type 4002 C | Ea | | | |
| | (2) Type 4012 C | Ea | | | |
| | (3) Wall angles (Bommer 1136) | Ea | | | |
| | (4) Wall flange ( " 1142) | Ea | | | |
| | (5) Brass tubing | LF | | | |
| | Ka) TUMBLER + TOOTHBRUSH HOLDER | Ea. | | | |

25X1A5a1 [redacted]

25X1A7a

COST ESTIMATE

Project: [redacted]
Location:



| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| | l. Towel bars, 24-inches | Ea | | | |
| | m. Labor | MD | | | |
| 15. | Painting: | | | | |
| 16. | Hardware | | | | |
| | a. Butt hinges, type 2102, 4½ x 4½ | Ea | | | |
| | b. Spring Hinges, type 2334 | Ea | | | |
| | c. Lock sets, type 160 L | Ea | | | |
| | d. Lock sets, type 161 L | Ea | | | |
| | e. Lock set, type 161 T | Ea | | | |
| | f. Kick plates, type 1225 | Ea | | | |
| | g. Push-&-pull plate, type 456 | Ea | | | |
| | h. Door stop, type 1329 E | Ea | | | |
| | i. Door stop, type 1330 | Ea | | | |
| | j. Door closer (LCN 303-H 90) | Ea | | | |
| | k. Threshold (brass) | Ea | | | |
| | l. Spring hinge, bommer 3000, 5" | Ea | | | |
| | m. Spring hinge, bommer 1042 | Ea | | | |
| | n. Belt & keeper, bommer 5007 | Ea | | | |
| | o. Strike, bommer 1072 | Ea | | | |
| | p. Latch & strike, 4302-4302A | Ea | | | |
| | q. Cabinet hinges, type 2277 | Ea | | | |
| | r. Pulls KV - 822 | Ea | | | |

25X1A7a

COST ESTIMATE

Project: [redacted]
Location:



| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| | a. Pulls KV - 807 | Ea | | | |
| | t. Friction catch, type F-1073D | Ea | | | |
| | u. Extension drawer slide, F 1315, | Pair | | | |
| | v. Sliding door track KV-465 | LF | | | |
| | w. Sheaves, KV-413 | Ea | | | |
| 17 | Ventilating Work: | | | | |
| | a. Power roof exhauster, 100 CFM | Ea | | | |
| | b. Kitchen fan, ceil.-mount. w/ stainl. ste. Grille, wall cap, 350 CFM | Ea | | | |
| | c. Ceiling grilles (for roof fans) | Ea | | | |
| | d. Duct work, galv, st. sht. # 22 GA | SF | | | |
| | e. Hangers & misc. | LS | | | |
| 18 | Plumbing & Utility work: | | | | |
| | a. Water closet | Ea | | | |
| | b. Lavatory, 18" x 20", w/ trim & control | Ea | | | |
| | c. Lavatory, 16" x 18", " " " " | Ea | | | |
| | d. Shower assembly | Ea | | | |
| | e. 2-comp. concr. laundry tray | Ea | | | |
| | f. 18" x 12" stainless steel sink in stainless st. counter top | Ea | | | |
| | g. Urinal, | Ea | | | |

25X1A7a

COST ESTIMATE

Project: [redacted]
Location:



| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| 10 | (Plumb. cont'd) | | | | |
| | k. Electr. water heater, 82 Gal. | Ea | | | |
| | l. Water piping w/ fittings: | | | | |
| | (1) Dismantling of exist. piping | LS | | | |
| | (2) Galv. st. pipe, 1½" | LF | | | |
| | (3) " " " , 1¼" | LF | | | |
| | (4) " " " , 1" | LF | | | |
| | (5) " " " , 3/4" | LF | | | |
| | (6) " " " , ½" | LF | | | |
| | j. Pipe insulation | LS | | | |
| | k. Valves Etc: | | | | |
| | (1) Gate valve, 1½" | Ea | | | |
| | (2) " " 1" | Ea | | | |
| | (3) " " 3/4" | Ea | | | |
| | (4) " " ½" | Ea | | | |
| | (5) Temp. & press. relief valve | Ea | | | |
| | l. Faucets: (1) Kitchen sink trim /w control | Set | | | |
| | (2) Laundry tray trim /w control | Set | | | |
| | m. Misc.: (1) Vacuum breaker | Ea | | | |
| | (2) Pipe hangers, etc. | LS | | | |
| | n. Soil, waste, vent, sewer, & storm drain: | | | | |
| | (1) Pipe, galv. st., 3" | LF | | | |
| | (2) " " " , 2½" | LF | | | |

25X1A7a

COST ESTIMATE

Project: [redacted]
Location:

Sheet 8 of 11

| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| 18 | (Plumb. cont'd) | | | | |
| | h. Electr. water heater, 82 Gal. | Ea | | | |
| | i. Water piping w/ fittings: | | | | |
| | (1) Dismantling of exist. piping | LS | | | |
| | (2) Galv. st. pipe, 1½" | LF | | | |
| | (3) " " " , 1¼" | LF | | | |
| | (4) " " " , 1" | LF | | | |
| | (5) " " " , 3/4" | LF | | | |
| | (6) " " " , ½" | LF | | | |
| | j. Pipe insulation | LS | | | |
| | k. Valves Etc: | | | | |
| | (1) Gate valve, 1½" | Ea | | | |
| | (2) " " 1" | Ea | | | |
| | (3) " " 3/4" | Ea | | | |
| | (4) " " ½" | Ea | | | |
| | (5) Temp. & press. relief valve | Ea | | | |
| | l. Faucets: (1) Kitchen sink trim /w control | Set | | | |
| | (2) Laundry tray trim /w control | Set | | | |
| | m. Misc.: (1) Vacuum breaker | Ea | | | |
| | (2) Pipe hangers, etc. | LS | | | |
| | n. Soil, waste, vent, sewer, & storm drain: | | | | |
| | (1) Pipe, galv. st., 3" | LF | | | |
| | (2) " " " , 2½" | LF | | | |

COST ESTIMATE

25X1A7a

Project: [redacted]
Location: [redacted]



| No. | Description of Item | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|
| 18 | (Plumb. cont'd) | | | | |
| | (3) Plum. Galv. St. , 2" | LF | | | |
| | (4) " " " , 1½" | LF | | | |
| | (5) " " " , 1¼" | LF | | | |
| | (6) " , C.I. , 4" | LF | | | |
| | (7) " , " " , 3" | LF | | | |
| | (8) " , " " , 2" | LF | | | |
| | (9) " , Conc. , 6" | LF | | | |
| | (10) " , " , 8" | LF | | | |
| | (11) " , " sym , 6" | Ea | | | |
| | (12) " , Plastic, , 6" | LF | | | |
| | (13) " , Plastic , 6", elbow | Ea | | | |
| | (14) Misc. fittings | LS | | | |
| | (15) Excavation & back fill | LS | | | |
| | o. Catch basins | Ea | | | |
| | p. Labor | MD | | | |

Project: [redacted]
Location:

COST ESTIMATE

Sheet 10 of 11

| No. | Description of Item | | Unit | Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|---|---|
| 19 | Electrical Work: | | | | | |
| | a. Building wires: | Conductor # 12 "TW" | LF | | | |
| | | Ditto # 10 "TW" | LF | | | |
| | | Ditto # 6 "TW" | LF | | | |
| | | Ditto # 1/0 "THW" | LF | | | |
| | | Flexible cable 2/c # 12 | FT | | | |
| | | Wire connectors, & misc. materials | LS | | | |
| | b. Conduit & fittings: | Cond. stl. rigid 1/2" ϕ | LF | | | |
| | | Ditto 3/4" ϕ | LF | | | |
| | | Ditto 1" ϕ | LF | | | |
| | | Ditto 1½" ϕ | LF | | | |
| | | Ditto 2" ϕ | LF | | | |
| | | Conduit elbow 1½" ϕ | Ea | | | |
| | | Ditto 2" ϕ | Ea | | | |
| | | Misc. conduit fittings | LS | | | |
| | c. Lighting fixtures: | Incand. ceiling light, type "A" | Ea | | | |
| | | Ditto, Bracket light "B" | Ea | | | |
| | | Ditto, wall light "W" | Ea | | | |
| | | Ditto, mirror light | Ea | | | |

COST ESTIMATE



Project:
Location: [redacted]



| No. | Description of Item | Unit Quant. | Unit Cost | Item Cost |
|---|---|---|---|---|
| d. | Switches, outlets & misc. wiring devices: | | | |
| | Receptacle, duplex 2p-3w-15a-125v | Ea | | |
| | Ditto, but combination type | Ea | | |
| | Ditto, but 3p-3w-60a-250v | Ea | | |
| | Wall switch 3p-15a-120 AC only | Ea | | |
| | Junction box, 4" sq w/cover | Ea | | |
| | Hot closet heater outlet & devices | Ea | | |
| | Cover foil outlet box | Ea | | |
| | Safety switch 2pstm 200$^{a}$-240$^{v}$ fusible | Ea | | |
| e. | Power panel "R" | Ea | | |
| f. | Labor: Unskilled | M/D | | |
| | Skilled | M/D | | |
| | Supervisor | M/D | | |
| | Total, materials and labor | | | |

## COST ESTIMATE

25X1A7a

Project: [redacted]
Location

Summary Sheet

| No. | Description of Item | Unit Quant. | Unit Cost | Item Cost | |
|---|---|---|---|---|---|
| 1. | Dismantling Work | | | | |
| 2. | Concrete Work | | | | |
| 3. | Concrete Block Work | | | | |
| 4. | Roofing | | | | |
| 5. | Misc. Metals | | | | |
| 6. | Aluminum Windows | | | | |
| 7. | Carpentry | | | | |
| 8. | Plaster Work | | | | |
| 9. | Tile Work, Ceramic | | | | |
| 10. | Acoustical Unit Work | | | | |
| 11. | Calking | | | | |
| 12. | Glazing | | | | |
| 13. | Resilient Floor Tile | | | | |
| 14. | Bathroom & Toilet Accessories | | | | |
| 15. | Painting | | | | |
| 16. | Hardware | | | | |
| 17. | Ventilating Work | | | | |
| 18. | Plumbing, Storm Drain, Incl. Excav. | | | | |
| 19. | Electrical Work | | | | |
| | Total, Materials + Labor | | | | |
| | Overhead + Profit | | | | |
| | | | | | |
| | Grand Total | | | | |

PART II - TECHNICAL PROVISIONS

SECTION 1

EXCAVATION, FILLING AND BACKFILLING

1-01 SCOPE: This section of the specifications covers earthwork, complete.

1-02 APPLICABLE STANDARD: The following standard, of the issues listed below but referred to thereafter by basic designations only, form a part of this specification:

American Association of State Highway Officials Standard Method:

T 99-49 Standard Laboratory Method of Test for the Compaction and Density of Soil.

1-03 ELEVATIONS AND OBSTRUCTIONS: Bids shall be based on the following:

(a) That the surface elevations are as indicated.

(b) That electrical conduits will be encountered.

In case the actual conditions differ substantially from those stated and/or shown, the provisions of clause 4 of U.S. Standard Form 23A respecting an adjustment for changed conditions shall apply, subject to the requirement of notification thereunder being given.

1-04 EXCAVATION:

a. General: The locations indicated on the drawings to be excavated shall becleared of natural obstructions, pavements, and other items that would interfere with the construction operations. Pavements shall be restored after completion of the work as specified in section CONCRETE. The excavation shall conform to the dimensions and elevations indicated on the drawings, except as specified below, and shall include trenching for sewer and storm drainage pipes, and all otherwork necessary for the completion of the work.

b. Drainage: Excavation shall be performed in such manner that the area of the site and the area immediately surrounding the site for a distance of 25 feet, including slopes and ditches, will be continually and effectively drained. Excavation for inlet, outlet anddiversion ditches as necessary, shall be performed under this section.

c. Shoring, including sheet piling, where required during excavation, shall be installed to protect workmen and the banks, adjacent paving, structures and utilities.

d. Protection or removal of utility lines: Existing lines that are shown on the drawings or the locations of which are known to the Contractor prior to excavation and that are to be retai shall be protected from damage during excavation and backfilling, and damaged, shall be repaired by the Contractor at his expense. Any exist utility lines that are to be retained and that are not shown on the draw or the locations of which are not known to the Contractor in sufficient t to avoid damage, if inadvertently damaged during excavation, shall be repaired by the Contractor, and adjustment in payment will be made in accordance with the Special Conditions of the Contract. Utility lines includ in work under this contract shall be installed before fill and backfilling is performed.

e. Excess material from excavation, not required for fill or backfill, shall be wasted where directed by the Contracting Officer and shall be graded.

f. Topsoil shall be removed, to a depth of 4 inches, from the area within lines 25 feet outside foundation walls, and shall be piled as directed by the Contracting Officer.

g. Blasting: Blasting will not be permitted. Rock excavation shall be done manually by drilling and chipping.

h. Grading: Areas required to be graded shall be constructed true to grade, shall be shaped to drain, and shall be maintained free from extraneous accumulations until inspection has been completed and the work has been accepted.

1-05 FILL: Where concrete slabs are to be placed on earth, any loam or organic or other unsuitable material shall be removed. Fill, where required to raise the subgrade for concrete slabs to the elevations indicated on the drawings shall consist of crushed stone, sand, or gravel. Fill shall be compacted by approved equipment, and the subgrade brought to a reasonably true and even plane. Crushed stone, sand or gravel used for fill shall be placed in layers not more than 12 inches thick.

1-06 BACKFILLING: Prior to backfilling, forms shall be removed and the excavation shall be cleaned of trash and debris. Backfill shall consist of the excavation, borrow of sand or gravel, and shall be free of trash, lumber or other debris. Backfill shall be placed in horizontal layers not more than 9 inches thick, and shall have a proper moisture content for the required degree of compaction. Each layer shall be compacted by hand or machine tampers or by other suitable equipment to a density approximating that of the adjacent undisturbed soil. Backfill shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage thereof. Backfill shall not be placed against foundation walls prior to 7 days after completion of wall and then only after approval by the Contracting Officer. Backfill shall be brought up evenly on each side of the wall as far as practicable. Heavy equipment for spreading and compacting backfill shall not be operated closer to the wall than a distance equal to the height of the backfill above the top of footing.

# SECTION 2

# CONCRETE

## (FOR BUILDING CONSTRUCTION)

2-01 SCOPE: This section covers concrete work, complete.

2-02 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

| | |
|---|---|
| QQ-S-632b | Steel Bar, Reinforcing, (for Concrete). |
| SS-A-281b(1) | Aggregate: (for) Portland-Cement-Concrete. |
| SS-C-00192e (COM-NBS) | Cement, Portland. |
| UU-P-264a. | Paper, Concrete-Curing, Waterproofed (Kraft). |

b. American Concrete Institute Publications:

| | |
|---|---|
| ACI 315-57 | Manual of Standard Practice for Detailing Reinforced Concrete Structures. |

c. American Society for Testing and Materials Standards:

| | |
|---|---|
| A 82-62T | Cold-Drawn Steel Wire for Concrete Reinforcement. |
| A 185-64 | Welded Steel Wire Fabric for Concrete Reinforcement. |
| C 39-64 | Compressive Strength of Molded Concrete Cylinders. |
| C 94-64 | Ready-Mixed Concrete. |
| C 260-63T | Air-Entraining Admixtures for Concrete. |

2-03 GENERAL: Full cooperation shall be given other trades to install embedded items. Suitable templates or instructions, or both, shall be provided for setting items not placed in the forms. Embedded items shall have been inspected, and tests for concrete and other materials or for mechanical operations shall have been completed and approved, before concrete is placed.

2-04 MATERIALS: The following materials shall conform to the respective specifications and other requirements stipulated below:

a. Aggregate (except for Lightweight Concrete): Federal Specification SS-A-281, class 1 and class 2. Coarse aggregate shall be well graded from fine to coarse within the prescribed limits. The nominal sizes shall be 1 inch to No. 4 for class A concrete: 1 1/2 inches to No. 4 for class B concrete; and 3/4 inch to No. 4 for small quantities of concrete jointed to old or set concrete.

b. Cement: Only one brand of any one type of cement shall be used in any individual structure. Cement reclaimed from cleaning bags or leaking containers shall not be used. Cement shall be used in the sequence of receipt of shipments, unless otherwise directed.

(1) Portland cement: Federal Specification SS-C-192, type I or type II.

(2) High-early-strength portland cement: Federal Specification SS-C-192, type III.

c. Curing materials: Federal Specification UU-P-264, or as approved.

d. Drainage fill under concrete floor slabs and areaways shall consist of clean crushed rock, crushed or uncrushed gravel, or other similar approved free-draining material of such size as will pass a 1-1/2-inch screen and not more than 5 percent will pass a No. 4 screen. Drainage fill shall contain no earth, clay, or any other foreign substances, that will be deleterious to pipe or conduit.

e. Forms: Wood, metal, structural hardboard, or other approved material that will not adversely affect the surface of the concrete and that will produce or facilitate obtaining the specified surface finish of the concrete.

f. Reinforcement:

(1) Bars: Federal Specification QQ-S-632, type II, grade C,D,F, or G, unless otherwise noted.

(2) Mesh reinforcement: ASTM Standard A 185, except as otherwise specified hereinafter. Mesh shall be of the sizes indicated.

g. Water: Clean, fresh, and free from injurious amounts of mineral and organic substances.

2-05 ADMIXTURES:

a. Air-entraining shall conform to ASTM standard C 260. Application method of material shall be subject to approval of the Contracting Officer. Amount shall be such as will give an air content of 4% of concrete.

b. Other admixtures, except accelerating agents, shall be used only on written approval.

c. Tests of admixtures will be made by the Government in accordance with applicable Federal or ASTM specifications or as otherwise prescribed.

2-06 SAMPLES AND TESTING:

a. General: Testing of the aggregate and reinforcement shall be the responsibility of the contractor. The testing agency shall be approved. testing of end items is the responsibility of the Government. Samples of concrete for strength tests of end items shall be provided and stored by the contractor when and as directed.

b. Concrete

(1) Strength tests during the work: the contractor shall provide for test purposes two sets of three cylinders taken from each day's pour of concrete placed. Cylinders shall be tested in accordance with ASTM Standard C 39.

2-07 STORAGE: Storage accommodations for concrete materials shall be subject to approval and shall afford easy access for inspection and identification of each shipment in accordance with test reports.

a. Cement: Immediately upon receipt at site of work, cement shall be stored in a dry, weathertight, properly ventilated structure, with adequate provision for prevention of absorption of moisture.

b. Aggregate Storage piles of aggregate shall be located as directed.

2-08 FORMS, complete with centering cores, and molds, shall be constructed to conform to shape, form, line, and grade required, and shall be maintained sufficiently rigid to prevent deformation under load. Studs shall be spaced sufficiently close to prevent deflection of form material and consequent waviness in surface of concrete.

a. Removal: Forms shall be removed only with approval of the Contracting Officer, in a manner to insure complete safety of the structure after the following conditions have been met.

2-09 REINFORCING STEEL, fabricated to shapes and dimensions shown, shall be placed where indicated on drawings or where required to carry out the intent of the drawings and specifications. Before being placed, reinforcing steel shall be thoroughly cleaned of loose or flaky rust, mill scale, or coating, and of any other substance that would reduce or destroy the bond. Reinforcing steel reduced in section shall not be used. After any substantial delay in the work, previously placed reinforcing steel left for future bonding shall be inspected and cleaned. Reinforcing steel shall not be bent or straightened in a manner injurious to the steel. Bars with kinks or bends not shown on drawings shall not be placed. The use of heat to bend or straighten reinforcing steel will be permitted only if the entire operation is approved. Reinforcing steel shall not be spliced at points of maximum stress. Laps or splices shall be of adequate length to transmit stresses and, unless otherwise indicated, shall conform to the table in ACI 315. Splices in adjacent bars shall be staggered.

a. Design and details: Unless other wise indicated the details of reinforcing steel shall conform to ACI 315.

2-10 CLASSES OF CONCRETE AND USAGE:

a. Strength requirements: The concrete required shall be proportioned and mixed for the following minimum strength:

| Class of Concrete | Minimum allowable compressive Strength at 28 days * Pounds per square inch |
|---|---|
| A | 3,000 |
| B | 2,500 |

* Concrete made with high-early-strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete of the class specified made with ordinary portland cement.

b. Usage: Concrete of the various classes shall be used as follows:

(1) Class A concrete: For all reinforced work not otherwise indicated.

(2) Class B concrete: For slabs on ground. (sidewalk repairs)

2-11 PROPORTIONING OF CONCRETE MIXES: Concrete shall be proportioned be weight. Average cement content and maximum water per bag of cement will be as follows:

| Class of Concrete | Average Cement Content Bags of Cement per Cubic Yard | Max. Water per Bag of cement Gallon |
|---|---|---|
| A | 5.5 | 6.0 |
| B | 5.0 | 6.75 |

a. Slump Test: Consistency will be determined by the slump test. The slump shall be 2 inches minimum and 3 inches maximum for vibrated concrete. When placing of concrete without vibration is approved, slump shall be from 3 to 6 inches.

2-12 READY-MIXED CONCRETE: Where ready-mixed concrete is proposed for use, the mixing and transporting equipment and the method of placement shall be subject to approval. Except for materials herein specified, ready-mixed concrete shall conform to ASTM Standard C 94, except that mixing time for mixers over 1 cubic yard capacity shall be increased 15 seconds for each additional 1/2 cubic yard or fraction thereof of material mixed.

2-13 CONSTRUCTION JOINTS:

a. Joints between old and new concrete: The surfaces of old concrete shall be thoroughly cleaned and kept moist for a period of 12 hours before the new concrete is placed. Bonding shall be accomplished by grouting as specified in paragraph BONDING AND GROUTING.

2-14 INSTALLATION OF ANCHORAGE ITEMS: Anchors shall be secured in position, inspected and approved before placing concrete.

2-15 PLACING CONCRETE: Concrete shall be handled from mixer to transport vehicle to place of final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredient until the approved unit of operation is completed. Concrete that has attained its initial set or has contained its mixing water for more than 45 minutes shall not be placed in the work. Placing will not be permitted when, in the opinion of the Contracting Officer, the sun, heat, wind, or limitations of facilities furnished by the contractor prevent proper finishing and curing of the concrete. Concrete shall be placed in the forms nearly as practicable in final position. Immediately after placing, concrete shall be compacted by thoroughly agitating in an approved manner. Tapping or other external vibration of forms will not be permitted.

2-16 COMPACTION: Concrete shall be compacted by mechanical internal-vibrating equipment supplemented by hand-spading, rodding, and tamping as directed.

2-17 BONDING AND GROUTING: Before depositing new concrete on concrete that has set, the surfaces of the set concrete shall be thoroughly roughened and cleaned of laitance, foreign matter, and loose particles. Forms shall be retightened and the surfaces of the set concrete slushed with a grout coat of neat cement. New concrete shall be placed before the grout has attained initial set. The first 3 inches of the new concrete shall be the regular mix except that the proportion of coarse aggregate shall be reduced 50 percent.

2-18 SLABS ON GRADE (sidewalks)

a. General: The installation of underground and embedded items shall be approved before slabs are placed. Pipes and conduits shall be installed below the concrete unless otherwise indicated. Fill required to raise the subgrade shall be placed as specified under Section EXCAVATION, FILLING, AND BACKFILLING. Drainage fill not less than 6 inches in thickness shall be installed under slabs on grade. The fill shall be leveled and uniformly compacted to a reasonably true and even surface. Immediately prior to placing the concrete the fill shall be covered with a vapor barrier.

b. Concrete shall have a slump of no more than 2 inches unless a greater slump is specifically authorized. Concrete shall be compacted, screeded to grade, and prepared for the specified finish.

c. Vapor barrier shall be carefully installed to avoid puncture or tear. Punctures and tears occurring during subsequent operations shall be patched. Edges shall be lapped not less than 4 inches and end joints shall be lapped not less than 6 inches. Patches and lapped joints shall be sealed with a pressure-sensitive adhesive or pressure-sensitive tape not less than 2 inches wide. Adhesive or tape shall be compatible with the membrane, and as recommended by the manufacturer of the membrane.

2-19 FINISHES OF FORMED CONCRETE: Immediately after removal of the forms all fins and loose material shall be removed; honeycomb, aggregate pockets, voids, and holes over 1/2 inch in diameter shall be cut out to solid concrete, thoroughly wetted, brush-coated with neat, cement grout, and filled with cement mortar composed of 1 part light-colored portland cement to 2 parts fine aggregate. Mortar shall be placed in layers as required, and each layer shall be thoroughly compacted in place. The final layer shall be finished flush and in the same plane as adjacent surfaces. Patchwork shall be damp cured for 72 hours. Exposed patchwork shall be rubbed or otherwise treated to match adjacent surfaces.

a. Surfaces to receive plaster:

(1) Surface treatment: Surfaces to which plaster is to be applied directly shall be removed to a depth of not less than 1/16 inch by chipping with a pneumatic chisel, by retarding the setting of the surface cement with a compound and removing the surface by scouring, or by other approved method that will expose the aggregate and leave a clean, firm, rough, granular surface. Treatment shall not affect the setting or strength of the concrete beyond a depth of 1/8 inch nor prevent the setting of the surface cement within a reasonable time after the forms are removed.

2-20 CONCRETE SLAB FINISHES: Repairs of finished floor-and roof-slab surfaces shall be true plane surfaces, flush with the existing slab surfaces. Surfaces shall be pitched to drains. The dusting of finish surfaces with dry materials will not be permitted.

a. Monolithic finish: Except where otherwise specified, slabs shall be finished by tamping the concrete with special tools to force the coarse aggregate away from the surface, then screeding and floating with straightedges to bring the surface to the required finish level. While the concrete is still green, it shall be wood-floated to a true, even plane with no coarse aggregate visible. Sufficient pressure shall be used on the wood floats to bring moisture to the surface. After the surface moisture has disappeared, surfaces shall be steel-troweled to a smooth, even, impervious finish, free from trowel marks. After the cement has set enough to ring the trowel, the surface shall be given a second steel-troweling to a burnished finish.

b. Sidewalks shall be jointed 4 feet on centers to match existing sidewalks.

2-21 CURING shall be accomplished by preventing loss of moisture, rapid temperature change, and mechanical injury or injury from rain or flowing water for a period of 7 days when normal portland cement has been used or 3 days when high-early-strength portland cement has been used. Curing shall be started as soon as free water has disappeared from the surface of the concrete after placing and finishing. And shall be accomplished in an approved manner.

2-22 DIAGONAL SLAB REINFORCEMENT shall be installed at all corners of roof openings made under this contract. The diagonal reinforcement shall be approximate 45 inches long # 4 bars, extending to outside edges of exposed slab area specified in section ROOFING, FLASHING & WATERPROOFING. The reinforcement shall be placed in 2½-inches wide grooves cut into the slab to the depth of the existing top reinforcement of the slab. The groove shall then be filled with epoxy mortar as specified in section ROOFING, FLASHING & WATERPROOFING in such a manner that the reinforcing bar is solid embedded with a mortar clearance of one inch at sides and top and not less than 3/8-inch at bottom. Preparation of groove surfaces, and mixing and application of the epoxy mortar shall be in strict accordance with the instructions of the manufacturer of the epoxy compound.

SECTION 3

MASONRY

3-01 This section covers masonry work, complete.

3-02 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent of the references thereto:

a. Federal Specifications:

| | |
|---|---|
| QQ-S-632b | Steel Bar, Reinforcing, (for Concrete). |
| SS-C-621 (1) | Concrete-Units, Masonry, Hollow. |
| TT-C-00598a (1) | Caulking compound, Oil & Resin Base Type (for Masonry and Other Structures). |

b. American Society for Testing and Materials (ASTM) Publications:

| | |
|---|---|
| A 82-62T | Cold-Drawn Steel Wire for Concrete Reinforcement. |
| A185-64 | Welded Steel Wire Fabric for Concrete Reinforcement. |
| C 476-63 | Mortar and Grout for Reinforced Masonry. |

3-03 MATERIALS:

a. Concrete-masonry units: Federal Specification SS-C-621, type I, grade B. Hollow concrete masonry units shall be free from deleterious matter that will stain mortar, plaster or paint, or that will corrode ferrous metal. Special units of suitable sizes and shapes shall be provided to form corner, returns and offsets and to maintain the proper bond.

b. Concrete-masonry cell grout fill shall be the coarse grout type of table II, ASTM C 476. The minimum compressive strength shall be 2,500 psi.

c. Caulking compound, gun-type: Federal Specification TT-C-598, grade 1.

d. Mortar for concrete-masonry unit work shall be type PL or PM of table I, ASTM C476.

e. Reinforcement:

(1) Bars: Federal Specification QQ-S-632, type II, grade C,D,E, or G; sizes as indicated. Mill certificates of tests on bar steel shall be provided.

(2) Masonry joint-reinforcement shall be flat strips of welded steel wire fabric conforming to ASTM standards A 82 and A 185. Longitudinal wires shall be No. 8-gage smooth or deformed wire: cross wires shall be No. 12-gage wire, spaced not more than 6 inches center to center for smooth longitudinal wires, and not more than 16 inches center to center for deformed longitudinal wires. The spacing of the longitudinal wires shall be 6 inches from center to center for 8" block walls and 2½ inches on centers for 4" block walls. Cross wires may be placed between and in the same plane as deformed longitudinal wires, but shall intersect above or below plain longitudinal wires. Joint reinforcement shall be glavanized after fabrication and shall be furnished in flat sections ranging from 10 to 20 or more feet in length. Reinforcement furnished in rolls will not be permitted. Special shapes shall be provided for corners and wall inter-sections.

f. Water: Clean, fresh, and free from injurious amounts of mineral and organic substances.

3-04 STORAGE OF MATERIALS:

a. Cement shall be stored in a dry weathertight structure immediately upon delivery at the site of the work.

b. Concrete masonry units shall be neatly piled, off the ground, and covered with tarpaulin to prevent wetting prior to use.

3-05 CONCRETE-MASONRY UNIT WORK:

a. Mortar shall be used before the initial setting of the cement has taken place. Retempering of mortar in which cement has started to set will not be permitted.

b. Vertical reinforcement shall be welded to existing reinforcement in beams, slabs, sills or heads.

c. Joints: All exposed joints shall be unifrom in thickness and vertical joints shall be broken halfway over the course below.. Joints shall be not less than 3/8-inch or more than ½-inch thick. Joints shall be tooled slightly convex and all excess mortar removed. Joint reinforcement shall be placed in every second horizontal joint, and lapped not less than 6 inches.

d. Workmanship: Concrete-masonry units shall be so handled that their edges and faces will not be chipped, spalled, or cracked. All beds shall be cleaned and wetted properly. Except where otherwise indicated, the concrete-masonry unit walls shall be reinforced with ½" diameter reinforcing steel at 16" on center vertically and with horizontal joint reinforcing at every second joint. The first course of concrete-masonry units shall be laid in a full bed of mortar, for the full width of the unit. The units shall be laid with the cells vertical and shall have the bed-joints formed by applying the mortar to the entire surfaces

of the inner and outer face shells. The mortar for joints shall be smooth (not furrowed), and of such thickness that it will be forced out of the joints as the units are being placed in position. Care shall be taken that mortar does not fall into cells that are to be filled with grout. The work shall be built level, square, plumb, and true. Bonding and coursing for masonry work shall be established before the work is started. All drilling, cutting, and fitting required by other work shall be done as necessary. Bolts, anchors, plugs, ties, lintels, scuppers, piping, and other work, where practicable, shall be placed in position as the masonry work progresse. Abutting walls shall be bonded or anchored to each other with reinfocement placed as shown. Cells with vertical reinforcement shall be filled with concrete grout. Cells to be filled with grout shall be cleaned and inspected before filling. Filling shall stop at mid-height of blocks to form shear keys. Cutting and fitting of masonry required shall be done with approved masonry saws by skilled masonry mechanics.

3-06 UNFINISHED WORK shall be stepped back for jointing with new work; toothing may be used only when approved. Before new work is started, all loose mortar shall be removed.

3-07 POINTING AND CLEANING: Upon completion of the work all holes in joints of exposed masonry surfaces shall be filled with mortar and suitably tooled. After pointing has set and hardened, all exposed masonry surfaces shall be cleaned with stiff fiber brushes, leaving the masonry clean and free from mortar daubs, and with tight mortar joints throughout. Immediately after cleaning, the masonry surfaces shall be thoroughly rinsed down with clean water.

3-08 CONTROL JOINTS in concrete masonry shall be calked as indicated with gun-type caulking compound conforming to Federal Specification TT-C-598.

## SECTION 4

## ROOFING, FLASHING & WATERPROOFING

4-01 SCOPE: This section covers roofing, flashing and waterproofing work, complete.

4-02 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification:

a. Federal Specification:

HH-R-590 Roofing Felt (Asbestos, Asphalt Saturated).

b. American Society for Testing and Materials Publications:

S 1763-62 Epoxy Resins.

4-03 MATERIALS:

a. Aggregate for epoxy mortar shall be clean sharp sand conforming to the requirements for fine aggregate in section CONCRETE

b. Epoxy resin for epoxy mortar shall conform to ASTM D 1763.

c. Waterproof cleavage membrane shall be either 15 pound asphalt-saturated roofing felt conforming to Federal Specification HH-R-590, or 6 MIL polyethylene sheeting.

4-04 PREPARATION OF SURFACES FOR ROOFING: Existing levelling mortar and built-up roofing shall be removed at roof gutters to a distance of 9 inches from the center line of the existing gutter, both sides, and at new concrete curbs for roof ventilators to a distance of 16 inches from exterior edges of curbs. The exposed roof slab shall then be cleaned of bituminous materials with an approved solvent and receive a final cleaning by sandblasting. Prior to application of new levelling mortar all particles of sand, dust, oil, grease and other foreign matter shall be removed from the concrete surface,

4-05 LEVELLING MORTAR shall be built up with a coat of cement mortar to roughly form the the gutter or curb base, topped by a thin coat of epoxy mortar.

a. Cement mortar shall consist of 1 part cement to 3 parts sand with only enough water added to give a 1-inch slump. The cement mortar shall be bonded to concrete and to the edge of existing levelling mortar with a coat of epoxy resin compound specially manufactured to bond fresh concrete to existing concrete (Furane Plastics, Inc.'s "epocast 25"; Sika Chem. Corp's "Colma bonding compound" or equal). The bonding coat and the cement moratr shall be applied in strict accordance with the instructions of the manufacturer of the bonding compound.

b. Epoxy mortar shall consist of a two-component epoxy compound mixed with 6 parts sand by volume. The epoxy mortar shall be applied in a thickness of ¼-inch. Mixing and application of the epoxy mortar shall be in strict accordance with the instructions of the manufacturer. (Sica Chem. Corp's "Celma Patching Compound", or equal). Epoxy mortar shall be steel troweled to smooth finish.

4-06 WATERPROOF CLEAVAGE MEMBRANE shall be installed prior to application of setting beds for quarry tile floors.

a. Preparation of surface: Existing asphalt tile shall be removed, but the bituminous primer and cement may remain in place provided a smooth surface is obtained. All non-bituminous matter shall be removed before application of the membrane.

b. Application of membrane: The asphalt felt shall be applied in full lengths from wall to wall. Edges shall be folded to form lock joints. Holes for floor- and shower drains shall be exactly centered on the drains, circular, and with a diameter small enough to insert and lock the membrane in the drainage pan of the drains.

SECTION 5

METALS, MISCELLANEOUS

5-01 SCOPE: This section covers miscellaneous metals not specified elsewhere.

5-02 APPLICABLE PUBLICATIONS: The following publications form a part of this specification to the extent of the references thereto.

a. Federal Specifications:

| | |
|---|---|
| O-G-93 | Galvanizing Repair Compound. |
| FF-B-571a(1) | Bolts; Nuts; Studs; and Tap-Rivets (and Material for Same). |
| FF-S-92(2) | Screws, Machine; Slotted or Cross-Recessed. |
| FF-S-107b | Screws, Tapping and Drive. |
| FF-S-111b & Int. Am 2 | Screw, Wood. |
| QQ-A-250/2b | Aluminum Alloy 3003, Plate and Sheet. |
| QQ-B-613b (1) | Brass, Leaded and Non Leaded; Flat Products (Plate, Bar, Sheet, and Strip). |
| QQ-S-633a(2) | Steel Bars, Carbon, Cold Finished and Hot Rolled, (General Purpose). |
| QQ-S-741b | Steel, Carbon: Structural Shapes, Plates and Bars. |
| QQ-S-763c | Steel Bars, Shapes, and Forgings, Corrosion Resisting. |
| QQ-S-766c & Int. Am 3 | Steel Plates, Sheets & Strip -- Corrosion Resisting |
| QQ-S-775c | Steel Sheets, Carbon, Zinc-Coated. |
| QQ-W-461e | Wire, Steel, Carbon, (Round, Bare and Coated). |
| GGG-D-777a(2) | Driver, Projectile Unit, Powder Actuated (above Water Only); Pin, Drive, Powder Actuated, Including Headed Pin and Threaded Studs); and Cartridge, Powder-Actuated Tool, (Power Loas). |

b. American Society for Testing and Materials Standards:

| | |
|---|---|
| A 123-63 | Specification for zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip. |
| A 153-61 | Specifications for zinc Coating (Hot-Dip) on Iron and Steel Hardware. |
| A 386-61 | Specifications for Zinc Coating (Hot-Dip) on Assembled Steel Products. |

c. American Welding Society Code:

Standard Code for Arc and Gas Welding in Building Construction.

5-03 GENERAL: All items of miscellaneous metal which are to be built into the structure or building shall be furnished to the trades concerned, as required during the progress of the work. Where miscellaneous metal items are required to fit existing construction, measurements for the fabrication of such items shall be made at the site. Standard commercial products which meet the general requirements of the drawings and specifications, and vary only in non-essential details, will be acceptable, subject to the approval of the Contracting Officer. All gages for steel, unless otherwise noted, shall be U.S. Standard; for aluminum: Brown and Sharpe.

5-04 SHOP DRAWINGS: 5 copies of shop drawings of the following fabricated items shall be submitted to the Contracting Officer for approval prior to manufacture or purchase:

a. Aluminum louvers.

5-05 SAMPLES of all metals shall on request be submitted to the Contracting Officer for appvoval before any materials are purchased. Samples of structural metals shall be selected by the Contracting Officer for testing from materials delivered to the site.

5-06 HANDLING AND STORAGE: All metal items shall be carefully handled to prevent damage to surfaces, edges, and shall be stored at the site off the ground in a covered, dry location. Damaged items that cannot be restored to like-new condition will be rejected and shall be replaced at no additional cost to the Government.

5-07 MATERIALS shall conform to the respective specifications and other requirements specified below:

a. Aluminum-alloy plates and sheets shall conform to FS QQ-A-250/2, alloy 3003, temper as required for the purpose.

b. Anchorage items shall be of the following materials for the various uses:

(1) Galvanized steel, conforming to FS QQ-S-741 and ASTM A 123, for steel to wood, steel, and/or concrete, and for wood to wood, steel, and/or concrete.

c. Brass divider strips for flooring shall conform to FS QQ-B-613. Dimensions are specified in section VINYL-ASBESTOS FLOORING.

d. Corrosion-resisting steel plate and sheet: ASTM A 167.

e. Fastenings not specified for a particular metal application shall be of the type best suited for the intended purpose. Corrosion-resisting-steel nails and screws shall be used for securing corrosion-resisting-steel or aluminum items. Brass bolts and screws shall be used for attachment of brass items. Galvanized-steel or corrosion-resisting-steel screws shall be used for securing galvanized items. Powser actuated drive pins and threaded studs shall conform to FS GGG-D-777. Other steel fasteners shall conform to the following specifications:

(1) Bolts, nuts, studs, and tap-rivets: FS FF-B-571.

(2) Machine screws: FS FF-S-92.

(3) Tapping and drive screws: FS FF-S-107.

(4) Wood screws: FS FF-S-111.

All fastening devices of steel shall be galvanized according to ASTM A 153.

f. Galvanized steel bars shall conform to FS QQ-S-633, and shall be hot-dip galvanized in accordance with ASTM A 153, class B.

g. Galvanized steel sheets: Federal Specification QQ-S-775, type I, class d.

h. Galvanizing repair compound: Federal Specification O-G-93.

i. Structural steel shapes indicated on the drawings, shall conform to FS-QQ-S-741. All structural shapes shall be galvanized according to ASTM A 123.

j. Miscellaneous: Materials not specified above shall be as indicated in the drawings or as hereinafter specified under the paragraphs for the various items.

5-08 WORKMANSHIP: All metalwork shall be performed by skilled metalworkers. Welding shall be continuous along entire line of contact, except where tack welding is shown by the approved shop drawings, or is authorized by the Contracting Officer. Exposed welds shall be ground smooth. Bolting shall be done with proper size bolts. Nuts shall be drawn tight and threads broken or upset. Steel shall be clean and free from mill scale, flake, rust, or pitting. All necessary holes, sinkages, and reinforcements shall be provided for attaching hardware or other items and suitable provisions shall be made for attachment to adjoining construction. Fastenings shall be concealed insofar as possible. Intersections shall be neatly made and joints inconspicuous. Welding of steel shall conform to the applicable requirements of the Standard Code for Arc and Gas Welding in Building Construction of the American Welding Society.

5-09 FINISHES:

a. Aluminum items to be painted: Prior to application of paint, the aluminum surfaces shall be clened with a solvent, treated with a chemical conversion coating and painted as specified in section PAINTING.

b. All other aluminum items shall be anodized in conformance with MIL-A-8625, unless otherwise specified hereinafter.

c. Brass or steel items in toilets, not specified to be painted, shall be chrominum-plated in accordance with FS QQ-C-320. Finish: US26.

d. Brass floor divider strips: Natural finish

e. Galvanized steel items shall be painted as specified under section PAINTING, GENERAL.

5-10 PROTECTIVE COATINGS:

a. Aluminum surfaces that will be in concealed contact with absorptive materials as wood, mortar, masonry or concrete or with steel, shall be given a coat of an alkali-resistant bituminous paint. Parts of exposed aluminum surfaces in contact with any of the above mantioned materials shall either have the actual contact area covered with nonabsorptive tape, or, where possible, have the contact joint calked according to section CALKING.

5-11 ANCHORAGE ITEMS: FURNISH and install all other anchors, anchor plates, bolts and nuts, lag screws and other approved anchorage devices shown on the drawings or required for the erection and completion of the work.

5-12 SUSPENDED CEILING SYSTEM shall consist of standard commercial galvanized steel furring channels spaced at 12" on centers and fastened to 1½" galvanized standard steel channels at 4 feet on centers with special galvanized hanger clips. Suspension members shall be 3/8" diameter galvanized steel bars, spaced at a 4 feet on centers, and fastened at ceiling to a powder-actuated 3/8" diameter threaded stud with a threaded galvanized steel coupling. The bars shall be connected to the supporting steel channels by means of an angle hanger clip of galvanized sheet steel, secured to the bar with 2 galvanized steel nuts and to the channel with a 3/8" bolt and nut. Trim supports at perimeter shall be wall angles of galvanized sheet steel. All dimensions shall be as indicated on the drawings.

5-13 COAT HANG RODS in closets ahall be 1-inch I.D. galvanized steel pipe. The hang rod shall be fastened at ends with standard cast brass or bronze hang rod flanges with finish as specified under section HARDWARE, BUILDERS'.

5-14 CURTAIN ROD for shower is specified in section: TOILET & BATHROOM ACCESSORIES.

5-15 DUCT WORK is specified in section VENTILATING SYSTEM, MECHANICAL.

5-16 FLOOR DIVIDER STRIPS are specified under section RESILIENT TILE FLOORING.

5-17 LOUVERS:

a. Louvers in counter doors shall be fabricated of No. 12 gage aluminum sheet or extrusions to sizes and shapes shown on the drawings. The louver frame shall be fastened to a trim frame angle, fabricated from No. 8 aluminum sheet and secured to the wood framing with wood screws of stainless steel.

5-18 STAINLESS STEEL EDGE TRIM & COVES for kitchen counters shall be the standard moldings of an approved manufacturer nearest the shapes indicated.

5-19 STRUCTURAL STEEL REINFORCINGS of standard angle, channel, and I- structural steel shapes shall be provided for installation where indicated on the drawings. All structural reinforcings shall be securely anchored as shown on the drawings or as directed.

5-20 THRESHOLDS are specified in section HARDWARE, BUILDERS'.

5-21 METAL STUD WALL shall be constructed of 4" perforated standard steel channel studs as commercially manufactured for plastered non-bearing hollow partitions. The studs shall have a minimum crosssectional area of 0.111 square inch. Studs shall be fastened at floor and ceiling to perforated steel channel runners with special steel shoes. Runners shall be secured to the floor with powder-actuated drive pins, bolts in expansion shield or other approved means, and to ceiling furring channels with self-drilling, self-tapping steel screws. A 3/4" horizontal stiffener channel with web horizontal shall be placed at 4 feet on centers, vertically, and at horizontal fastening line of wall-hung cabinets. Wood grounds at base are specified in section CARPENTRY; metal lath is specified in section PLASTER WORK.

5-22 MISCELLANEOUS METAL ITEMS not specified above or included in other sections, but shown on the drawings, or required according to standard practice, shall be furnished and installed.

SECTION 6

ALUMINUM WINDOWS & ASSOCIATED WORK

6-01 SCOPE: The work covered by this section of the specifications consists in removing aluminum windows and door frames designated to be relocated, furnishing required new windows, and to install new and removed windows in their new locations.

6-02 ASSOCIATED WORK: Glass shall be taken out from windows under section GLAZING before the windows are removed.

6-03 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification:

a. Federal Specifications:

| | |
|---|---|
| L-S-125 & Int. Am. 1 | Screening, Nonmetallic, Insect. |
| FF-B-575b | Bolts, Hexagon and Square. |
| FF-S-92 (2) | Screw, Machine; Slotted or Cross-Recessed. |
| QQ-A-200/9a | Aluminum Alloy Bar, Rod, and Shapes, & Tube, Extruded, 6063. |
| QQ-A-225/6b | Aluminum Alloy Bar, Rod, & Wire, Rolled, Drawn, or Cold Finished, 2024 |
| QQ-A-250/2b | Aluminum Alloy 3003, Plate and Sheet. |
| QQ-S-763c | Steel Bars, Shapes, & Forgings, Corrosion Resisting. |
| QQ-S-766c(2) & Int. Am. 3 | Steel Plates, Sheets and Strip,—Corrosion Resisting. |
| TT-P-320a | Pigment, Aluminum; Powder and Paste, for paint. |
| TT-P-645 | Primer, Paint, Zinc-Chromate, Alkyd Type. |
| TT-V-119(2) | Varnish, Spar, Phenolic-Resin. |

b. Military Specifications:

| | |
|---|---|
| MIL-P-6883 | Paint, Blended-Type, Coal-Tar-Pitch Base, Bituminous. |
| MIL-A-8625A | Anodic Coatings for Aluminum and Aluminum Alloys. |

c. Architectural Aluminum Manufacturer's Association Publication:

| | |
|---|---|
| AAMA 302.1 | Aluminum Windows Specifications (1962) with Addendum Effective Jan. 1, 1963 |
| Bulletin No. 100 | |

d. American Society for Testing and Materials Standards:

| | |
|---|---|
| A 386-61 | Zinc Coating (hot-Dip) on Assembled Steel Products. |
| B 136-63T | Test for Resistance of Anodically Coated Aluminum to Staining by Dyes. |
| B 137-45 | Test for Weight of Coating on Anodically Coated Aluminum. |

e. Aluminum Association Publications:

Standards for Aluminum Mill Products (6th Ed).

Standards for Anodically Coated Aluminum Alloys for Architectural Applications (Jan. 1962).

f. Aluminum Window Manufacturers Association Publication:

Rules and Regulations for Specification Conformance Test Program and Procedures: June 1959.

Performance Specifications for Clear Coatings for Aluminum Windows: October 1956.

6-04 GENERAL: Aluminum windows shall be intermediate projection type of sizes and shapes indicated on the drawings. Frames for windows shall be manufactured as integral units and disassembled for shipping. The Contractor shall verify all masonry openings.

6-05 SHOP DRAWINGS:

a. The Contractor shall submit within ten (10) days after notice of award and prior to ordering the sash four (4) copies of shop drawings of new windows to the Contracting Officer for approval. One (1) approved or corrected copy will be returned to the Contractor upon receipt of which the Contractor shall submit one (1) transparency of each shop drawing. Shop drawings shall contain the following information:

(1) Large scale detail drawings, clearly showing construction, sizes, thicknesses and gages of metal, fastenings, method of anchoring, sizes and spacing of glazing, details of operating hardware, mullion details, method and materials for weatherstripping, method for reception of screens; and all other pertinent information, including surfaces to receive bituminous paint which shall be marked with red color on the prints.

(2) A complete material list shall be shown, giving quantities, description and location of all materials.

(3) The Contractor shall furnish exact sizes of all glass.

(4) The name of the Contractor and of the manufacturer, date, the title and identifying number of the drawing, the project title, commodity and item number shall be shown-in the lower right hand corner of the drawing. Also the drawing shall be marked either "Partial Submittal" or "Complete Submittal".

b. All materials and accessories delivered to the site shall be clearly marked in accordance with the shop drawings.

c. Approval of shop drawings shall not relieve the Contractor of responsibility for compliance with the specifications herein and the applicable drawings.

6-06 DESIGN

a. The windows and screens shall be designed and manufactured in accordance with the specifications and of the types and sizes indicated on the drawings. The drawings are intended to be illustrative only and alternate designs shall be considered for approval but shall be subject to adherence to the types and sizes indicated on the drawings and to the specification requirements. The windows shall be weathertight at all points in conditions of driving rains and shall be designed to withstand one hundred and sixty (160) miles per hour wind pressure applied perpendicular to the surface without permanent distortion or damage when the windows are fully assembled, glazed and the ventilators closed. Stresses are not to exceed those recommended in AA Standard (6. Ed.). Deflection of any individual member shall not exceed 1/180 of the span when subject to the wind load specified. Windows shall be designed for 7/32 inch thick glass and for outside mastic glazing with 0.0369 inch thick aluminum slotted glazing angles not less than 5/8 inch long.

b. The windows shall fit the openings without requiring additional bucks, grounds and/or sub-frame, and shall be suitable for permanent installation in previously cast concrete walls. The ventilators shall open out through a minimum are of sixty degrees ($60^{\circ}$) to the horizontal.

c. All ventilator sashes shall be prepared for screens, easily attached from the interior.

6-07 MATERIALS

a. Window sections shall be especially designed aluminum shapes of 6063-T5 alloy. The aluminum alloy and tempers shall conform to the requirements of Federal Specification QQ-A-200/9. Sections shall be of the minimum thickness as shown on drawings but not less than 5/32 inch for sashes. The combined depth of the frame and the ventilators shall be not less than 1-3/4 inches. All aluminum screws, bolts and nuts shall be of 2024 -T36 alloy conforming to Federal Specifications QQ-A-225/6 and FF-S-92.

Stainless steel washers shall be used for fastening bolts and nuts as indicated. All corrosion-resisting steel plates and sheets shall be Class 304L, finish 4 both sides, in accordance with Federal Specification QQ-S-766. Screen cloth shall conform to Federal Specification L-S-137. Aluminum sheet shall be 3003 or 5005 alloy, temper as required and directed.

b. Fasteners: All screws, nuts, bolts, rivets and other miscellaneous Fastening devices incorporated in the windows shall be of 2024 T36 aluminum alloy as specified above or of non-magnetic stainless steel conforming to Federal Specification QQ-S-763. And shall be of sufficient strength to perform the functions for which they are used. Plated or coated material will not be permitted. Screws shall conform to Federal Specification FF-S-92; bolts shall conform to Federal Specification FF-B-575.

c. Hardware shall be of solid silver nickel ("white bronze") with a chemical composition as specified in table I of Federal Specification FF-H-106, or of stainless steel. Hardware shall have satin finish.

(1) For Project-Out Vents: Locking cam handles shall be similar to Truscon Nr. P-15318 and shall be secured to ventilator and sash with at least four CRES screws.

Bronze hardware shall be separated with a B & S 20 gauge non-magnetic stainless steel sheet from the aluminum windows. All screws for hardware shall be of non-magnetic stainless steel.

d. Moving Parts. There shall be no aluminum-to-aluminum contact between hardware parts or window members which are required to move relative to one another and at the same time remain in contact.

e. Anchors. All anchoring devices used in the erection of the windows shall be of stainless steel,. Heavily galvanized steel anchors may be used provided that they shall be properly insulated from the aluminum by 20 gauge corrosion resistant steel sheet.

f. Weather Stripping. Ventilators shall be especially extruded sections with dove-tail grooves for holding the tubular weather-stripping as indicated on the drawings. Weather strips shall be of poly-vinyl-chloride plastic or other approved material and shall be designed for easy removal and replacement.

6-08 CONSTRUCTION:

a. Construction. The corners of the window frames and ventilators shall be coped,mortise and tenon construction providing rigid and secure connection. The ventilator shall have continuous

double point contact and a full ¼ inch weathering lap. Project-out ventilators shall open on two balanced aluminum arms (which shall be concealed when ventilators are in closed position) having adjustable sliding pivots with non-abrasive friction shoes and concealed compression springs. The sliding shoes shall move on non-magnetic stainless steel angle guides of sufficient depth to conceal the friction shoes. Project-out ventilators shall open out at the bottom. Surfaces to be glazed shall have retaining lips not less than 1/8 inch and extruded serration for putty retention. Ventilators shall be provided with limit stops and aligment guides. Drips shall be closed at ends.

b. Muntins. Muntins shall be continuous from jamb to jamb as shown on drawings with intersections rigidly interlocked. End joints shall be securely riveted to sash members of solid section ventilators. Extruded serration shall be provided for putty retention.

c. Screens. Screens frames shall be of B & S 14 gage formed or extruded aluminum. Screen cloth shall be secured to the screen frames with removable plastic splines not less than 7/32 inch in diameter. Screens for project-out vents shall be furnished with a screened wicket giving access to the window locking handle. Wicket sliding, guide shall be integral with a reinforcing horizontal aluminum member at the top of the wicket. The wicket guide frame shall be securely fastened to the reinforcing member and to the bottom of the screen frame, and the wickets shall be sidesliding. Clips or other means for securing the screen frames to the window frames shall be of a type to provide secure installation and to permit ready removal of the screens without loss of parts.

d. Dimensions:

The drawings show the desired dimensions of the windows. The Contractor shall verify all masonry openings to insure sufficient clearances for installation.

e. Framing.

(1) Window frames and ventilators shall be fully assembled, including all hardware and other materials for installation at the site.

(2) Window frames and ventilators shall have a mill finish with sharp, clean angles; cuts shall be true and neatly made, all burrs removed, and surfaces shall be free of marks and blemishes.

(3) The design and fabrication of the window frames and ventilators shall insure a neat and weather-tight unit and shall provide a permanent water-tight joint at the junction of the sill and side-frame members.

(4) Frame members shall be welded or interlocked rigidly at joints with accurate and close fits and welded joints dressed smooth.

6-09 FINISH

All exposed exterior and interior surfaces of aluminum shall be cleaned thoroughly and given a finish standard with the manufacturer which shall be uniform in color and free from blemishes and then shall be given an anodic coating conforming to Military Specifications MIL-A-8625, Type II, and the coating shall be sealed. The weight of coating and the effectiveness of sealing shall be as determined by ASTM standards B 137 and B 136. The finished products shall match approved samples. After cleaning and finishing and prior to shipment, two coats of a clear, colorless, methacrylate lacquer shall be applied to all surfaces of the aluminum. The lacquer shall conform to AWMA performance specifications for clear coatings for aluminum windows. Before shipment from the factory, all portions of aluminum work, which will be in contact with concrete or masonry construction or with other metals, shall be given a heavy coat of an alkali-resistant bituminous paint conforming to Military Specifications MIL-P-6883. The paint shall be applied in the consistency in which it is received from the manufacturer.

6-10 TESTS:

The contractor shall, when requested, submit to the Contracting Officer duplicate copies of certificate for air infiltration and water resistance tests performed by an approved commercial testing laboratory in accordance with AAMA testing procedures as set forth in AAMA Bulletin No.100, using the same window for each test. The air infiltration test shall show that air infiltration does not exceed one cubic foot per minute per linear foot of ventilator perimeter with ventilator in closed position and locked when the window is subjected to a static air pressure equal to the pressure exerted by wind at a velocity of 25 miles per hour. The water resistance test shall show that no water passes the interior face of the window frame when 1¼ gallons of water per hour per square foot of window area is applied to the exterior face of the unit for a period of 15 minutes under a stabilized static pressure of 2.86 pounds per square foot. However, such certificate shall not relieve the Contractor from the responsibility to conform to the additional requirements of these specifications.

6-11 INSTALLATION: Installation shall be done only by skilled window mechanics. Windows shall be set straight and true, to exact lines and levels, and properly braced to prevent distortion. Ventilators, frames and operating parts shall be protected against accumulation of cement, lime and other building materials. All anchors shall be set prior to installation. Glazing shall be done in accordance with the provisions of section on GLAZING and shall be done at the time specified by the Contracting Officer.

6-12 CALKING: All joints between windows, frames and surrounding construction shall be calked as shown on the drawings and specified in section on CALKING.

6-13 PROTECTION: All aluminum windows, including frames, shall be shipped, stored, handled and installed by methods that will protect material and surfaces from damage until acceptance of the work.

6-14 ADJUSTMENT: On completion of glazing and all other trade work concerned, the Contractor shall inspect all aluminum windows and hardware and make all adjustments necessary for easy unrestricted operation.

SECTION 7

CARPENTRY

7-01 SCOPE: This section covers general carpentry, complete.

7-02 APPLICABLE PUBLICATIONS: The following publications form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

| | |
|---|---|
| FF-B-561b. | Bolts, Lag. |
| FF-B-571a (1) | Bolts, Nuts, Studs, and Tap Rivets (and Material for Same). |
| FF-B-575b. | Bolts, Hexagon and Square. |
| FF-B-00588b & Int. Am. 1 | Bolts, Toggle. |
| FF-N-00103b | Nails (Small) and Tacks: Cut. |
| FF-N-105a & Int. Am. 2 | Nails, Wire, Brads, and Staples |
| FF-S-111b & Int. Am. 2 | Screw, Wood. |
| FF-S-325 & Int. Am. 2 | Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry). |
| HH-I-521c (1) | Insulation, Building, Mineral-Wool; Batts, Loose-Fill, and Granular-Fill. |
| MM-L-00736a (GSA-FSS) Rev. 2 | Lumber and Timber; Hardwood. |
| MM-L-00751f (1) (GSA-FSS) | Lumber and Timber, Softwood. |
| RR-W-370. | Wire Fabric, Steel, Hot-Dipped Galvanized. |
| SS-B-755 | Building Board, Asbestos-Cement Flat. |
| TT-C-00598a (1) | Caulking Compound, Oil & Resin Base Type (for Masonry and Other Structures). |
| TT-V-121e | Varnish, Spar, Water-Resisting. |
| MMM-A-125b | Adhesive, Casein-Type, water-and-Mold-Resistant. |
| MMM-A-00181 (Army-MR) | Adhesive, Room-Temperature & Intermediate-Temperature Setting Resin (Phenol Resorcinol, & Melamine Base). |
| MMM-A-188b | Adhesive; Urea-Resin-Type (Liquied and Powder). |

b. Military Specifications:

| | |
|---|---|
| MIL-C-15328A. | Coating, Pretreatment (Formula No. 117 for Metals). |

c. Housing and Home Finance Agency Publication:

Technique of House Nailing, November 1947

d. U.S. Department of Commerce Commercial Standards:

| | |
|---|---|
| CS35-61. | Hardwood Plywood. |
| CS45-60. | Douglas Fir Plywood. |
| CS171-58. | Hardwood Veneered Doors (Solid-Core, Hollow-Core, and Panel and Sash). (With Amendments 1962) |

e. American Institute of Timber Construction Publication:

Timber Construction Standards, Second Edition, 1956, with 1958 Supplement, Section 900.

f. American Wood-Preservers' Association Publication:

Manual of Recommended Practice.

g. National Woodwork Manufacturers Association Publication Reference Manual, Section II:

Water Repellent Preservative Seal of Approval Program (Rev. July 16 1958).

7-03 LUMBER:

a. Grade marking: Each piece of framing and board lumber shall bear the trademark and grademark of the manufacturer. Other lumber shall be grademarked.

b. Sizes and patterns: Lumber shall be surfaced four sides. Lumbers shall be worked to such patterns as are indicated or specified. Worked material, unless otherwise indicated, shall conform to the standard patterns of the current grading rules for the species.

c. Moisture content: Except as hereinafter specified, lumber to be incorporated in the structure shall conform to the moisture-content requirements of Federal Specifications MM-L-736 and MM-L-751, as applicable. Lumber treated with water-borne preservatives shall be dried to a moisture content not exceeding 19 percent after treatment.

(1) Common 2-inch lumber and boards: Upon receipt of application, the Contracting Officer may permit the contractor to furnish

common 2-inch-dimension lumber and boards or lumber 2 inches and thicker having a moisture content in excess of the foregoing requirements subject to the following conditions:

(a) That the lumber be suitably piled under adequate cover for air-drying on the site, at no additional cost to the Government.

(b) That the treated lumber be air-dried to a moisture content conforming to the applicable foregoing Federal Specification.

(c) That increase in construction time not be required.

(2) Interior finishing lumber shall be kiln-dried, and at time of delivery to the building site, the moisture content shall not exceed 12 percent for material 1 inch or less in thickness, and shall not exceed 15 percent for material over 1 inch in thickness.

(3) Woodwork that is assembled or built up of more than one piece at the mill, except doors, shall have a moisture content not in excess of 12 percent at time of delivery to the building site.

d. Delivery and storage: Lumber delivered to the site shall be carefully piled off the ground in such manner as to insure proper drainage, ventilation, and protection from the weather.

(1) Interior finish and doors, shall be stored at the site in approved weathertight enclosures only and at the risk of the contractor, and shall not be brought into the building until all wet construction (concrete, plaster, etc.) has been completed and is dry.

7-04 MATERIALS OTHER THAN LUMBER:

a. Adhesives for gluing woodwork shall be as follows:

(1) For millwork, and woodwork, adhesive shall be moisture-resistant conforming to Federal Specification MMM-A-125, type II, or MMM-A-188, types I, II, or III.

(2) For doors: Federal Specification MMM-A-181, type as applicable.

b. Anchors and fasteners for securing wood items, unless noted otherwise, shall be as follows:

(1) Bolts, nuts, studs, and rivets, shall conform to Federal Specifications FF-B-571 and FF-B-575, as applicable.

(2) Expansion shields: shall conform to Federal Specification FF-S-325, group, type, class, and style best suited for the purpose. Shields shall be accurately recessed and, unless otherwise indicated, shall

be not less than 2-½ inches into concrete or masonry. Devices of groups IV, V, VI, And VII shall not be used in sizes greater than 3/8 inch unless otherwise indicated.

(3) Lag screws or lag bolts shall conform to Federal Specification FF-b-561, type and grade best suited for the purpose.

(4) Toggle bolts shall conform to Federal Specification FF-B-588, type and class best suited for the purpose.

(5) Wood screws shall conform to Federal Specification FF-S-111, style and material as indicated or best suited for the purpose.

(6) Nails and staples shall conform to Federal Specification FF-N-105, type and size best suited for the purpose.

(7) Tacks shall conform to Federal Specification FF-N-103, type and size best suited for the purpose.

(8) Powder-driven fastenings shall be ramset powder-driven fasteners or equal. Sizes shall be those recommended by the manufacturer for the purpose.

c. Asbestos cement sheets shall conform to Federal Specification SS-B-755, type F, ½" thick sizes as required.

d. Hangers for suspended ceiling systems are specified in section MISCELLANEOUS METALS.

e. Insulation shall conform to Federal Specification HH-I-521, type I, class C, and shall be 2 inches thick.

f. Nails and staples: Except as specified otherwise hereinafter, nails and staples shall conform to Federal Specification FF-N-105, with mechanically deformed shanks. Unless otherwise speicified hereinafter, mechanical-tool-driven staples, where permitted for use, shall be of the divergent, chisel-point type.

g. Plastic laminate shall be a melamine surfaced, grade 1, 1/16 inch thick high-pressure decorative laminat as manufactured by the Formica Corporation, or equal. The patterns shall be as directed by the Contracting Officer.

h. Plywood shall conform to Commercial standard CS35, type I. Each sheet of plywood shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over

the quality of the plywood. The mark shall identify the plywood as to species, glue type, grade, and compliance with the applicable commercial standard. Plywood shall be pressure-preservative treated and shall be exterior-glue type and of grade not less than that specified for the specifiec use.

j. Spar varnish shall conform to Federal Specification TT-V-121.

7-05 SAMPLES of the following shall be delivered to the Contracting Officer for inspection and approval before delivery of these materials to the site:

Doors -- One corner section each of a typical flush door.

Plastic laminate: One sample, 6", of each pattern.

Nailing plugs, bolts, and screws -- Two samples of each kind.

7-06 SHOP DRAWINGS of doors and frames, counters and closets shall be submitted in quintuplicate for approval to the Contracting Officer. Materials shall not be delivered to the site until after the shop drawings have been approved. The contractor shall be responsible for all errors of detailing and fabrication, and for the correct fitting of mill-fabricated items shown on the shop drawings,

7-07 PRESERVATIVE TREATMENT: All items of wood to be permanently incorporated in the structure shall be given preservative treatment.

a. Lumber: Pentachlorophenol shall be used as a preservative for all lumber. Mineral spirits shall be used as the penetrating vehicle for lumber to be painted. Moisture content is to be reduced to 19 percent prior to pentachlorophenol preservative treatment. Kerosene may be used as the penetrating vehicle of pentachlorophenol solution for lumber not to be painted. Timber to be treated shall be completely immersed in a bath of 5 percent solution of pentachlorophenol at atmospheric temperature for a period of 5 hours per inch of least dimension. The lumber so treated must be allowed to dry for a period of 30 days, or as directed by the Contracting Officer, prior to application of priming and painting as required under PAINTING: GENERAL. The treatment plant assembly shall permit ready inspection of operations at all times. The plant and its location shall be subject to the approval of the Contracting Officer. Lumber to be fitted, cut or worked after the preeservative immersion treatment ahsll receive a thorough brushed-on coat of pentachlorophenol solution of the same mixture used at the plant on all fresh cut surfaces.

b. Plywood shall be pressure-preservative treated according the American Wood-Preservers' Association's Manual of Recommended Practice.

7-08 TEMPORARY CENTERING, BRACING, AND SHORING shall be provided as required for the support and protection of masonry work during construction. Forms and centering required for cast-in-place concrete work are specified in section CONCRETE.

7-09 ROUGH CARPENTRY:

a. Lumber for rough carpentry shall be lauan No. 2 common.

b. Framing shall be closely fitted, accurately set to required lines and levels, and rigidly secured in place in conformance with the Housing and Home Finance Agency publication "Technique of House Nailing" except as modified herein or otherwise indicated.

c. Partitions shall be framed with 2- by 4-inch studs spaced 16 inches on centers unless otherwise shown. Plated of partitions resting on concrete floors shall be anchored in place with expansion bolts, or powder-driven fasteners, one near each end of each piece and at intermediate intervals of not more than 3 feet between bolts. Studs shall be doubled at openings. Unless otherwise indicated, headers for openings shall be made of two pieces of stud material set on edge, and corners shall be constructed of not less than three full members. End studs of partitions abutting concrete or masonry shall be anchored thereto with ½-inch expansion bolts, one near each and of each stud and at intermediate intervals of not more than 3 feet berween bolts. Studs shall be framed as indicated or required for the proper installation of trim, cabinets, plumbing, and other work. Where vertical facing is indicated, unless shown otherwise, 2- by 4-inch blocking shall be cut in between studding at 16 inchesson centers. Nailing strips shall be cut in as required for the support of fixtures of all kinds.

d. Blocking of not less than 2- by 4-inch stock or lumber the size of frming members shall be cut to fit herizontally between framing members and rigidly nailed thereto. Ends and square edges of plywood, asbestos-cement board, metal lath, and plastic laminat die, not occurring on supporting framing,, shall have blocking.

e. Furring, unless otherwise indicated, shall be 1- by 3-inch continuous strips, 16 inches on centers, installed vertically on walls where shown. Furring strios shall be secured to masonry or concrete walls with approved nailing plugs or elips set in masonry or concrete near top and bottom of walls and 2 feet on centers intermedietely. Furring strips against concrete masonry units shall be secured by toggle bolts, anchor bolts, or other approved devices. Furring studs of 2- by 3-inch and 2- by 4-inch lumber shall be installed where indicated on the drawings. Furring studs shall be secured to concrete or masonry walls with expansion bolts or powder driven fasteners. Furring studs not secured to walls shall be fastened as specified for studs in subparagraph on "Partitions". Furring strips and studs shall be erected plumb and rigid, using wood shims wherever necessary so that the face of furring shall form a true even plane. Furring strips shall be

furnished as required for support of built-in cabinets.

f. Wood grounds shall be furnished as required for securing wood trim and other items in plasterwork. Grounds shall be set rigid, in perfect alinement, and shall be trued with an 8-foot-long straightedge. Grounds shall be dressed stock not less than 1-½ inches wide and of a thickness to provide for plaster of thickness speicified in SECTION: PLASTER OWRK. Two grounds shall be provided for wood bases. Grounds shall be nailed to wood blocking and secured to mansonry or concrete as specified for furring. Temporary grounds shall be set as required for plasterwork.

g. Back blocking shall be provided as necessary for proper installation and attachment of fixtures, equipment, and other such items as required.

h. Fire blocking, 2" thick by width of enclosing space, shall be provided at intersections of partitions and furred walls with ceiling, preventing vertical and horizontal drafts and communication by fire through concealed spaces. Fire stopping shall form a complete separation for entire width of partitions, spaced in such manner that concealed air spaces have no dimension greater than 7-feet in any direction. Fire stops shall be sufficiently stiff to act as lateral bracing for studs.

i. Door bucks in masonry and concrete walls and partitions shall be of dressed materials of the thickness and width indicated on the drawings. Bucks shall be braced, set straight, true, and plumb, and secured with anchors specified hereinbefore in paragraph: Partitions.

7-10 THERMAL INSULATION shall be installed over new metal-suspension ceiling. The batts shall be lapped 3 inches at joints.

7-11 Ceiling Boards of asbestos-cement shall be fastened to the metal suspension sytem with 1" self-drilling, self-tapping screws at one foot on centers, both ways.

7-12 INTERIOR DOORFRAMES: Interior doorframes, unless indicated otherwise, shall be 1-5/8 inch thick, full width of finished wall or partition, and shall have 5/8-inch-thick integral or applied stops. Frames shall be constructed in accordance with details on the drawings. Frames shall be set plumb and square, double wedged, and secured with finishing nails. Solid blocking shall be provided back of jambs at butts and lock strikes. Blocking shall be placed at a maximum of 16 inches on centers. Frames in masonry where no bucks are indicated or required shall be double-rabbeted from solid 2-inch stock and shall have three jamb anchors on each side.

7-13 WOOD DOORS of the types and sizes indicated shall be provided. Top and bottom edges of doors shall be given two coats of varnish conforming to Federal SpecificationsTT-V-121, or other approved water-resistant sealer at the factory. Doors shall be fabricated with adhesive conforming to Federal Specification MMM-A-181. Doors shall be treated with a water-repellent preservative at the factory in accordance with the minimum standards of the NWMA Reference Manual. Doors shall conform to the warp-or twist-tolerance requirements of Commercial Standard CS171. Doors shall be fitted, hung, and trimmed as herein specified or as indicated. Doors shall have a clearance of 1/16 inch at thesides and top and as required at the bottom for the specific location to provide the minimum adequate clearance of the floor coverings. The lock edge of the doors shall be beveled at the rate of 1/8 inch in 2 inches. Glass and glazing are covered in section: GLASS WORK.

a. Flush doors, unless otherwise indicated, shall be hardwood-veneered doors, as indicated. Grain of veneers shall be vertical.

(1) Solid-core doors shall have wood cores or composition cores.

(a) Wood-core doors may be of the vertical-block type or the stile-and-rail type. Doors shall conform to applicable requirements of Commercial Standard CS171 as modified herein.

(b) Composition-core doors shall conform to the applicable requirements of Commercial Standard CS171. Adequate hardware blocking, in addition to lock blocks, shall be provided on doors for which closers or floor hinges are specified in section: HARDWARE, BUILDERS'.

(2) Hollow-core doors, when hardwood veneered, shall conform to applicable requirements of Commercial Standard CS171 as modified herein. Using good grade for paint finish. When hollow-core doors are softwood-veneered, the quality and construction shall be equal to those specified for hardwood-veneered doors. Except as herein specified, type of core construction shall be optional. Adequate hardware blocking, in addition to lock blocks, shall be provided on doors dor which closers or floor hinges are specified in SECTION: HARDWARE, BUILDERS'.

(3) Glazed doors shall be provided with glazing stop beads as indicated.

(1) Screen cloth shall be 18-by 18-mesh. Metal screen cloth shall conform to Federal Specification RR-S-141, type II, III, or VII, regular wire size. Plastic-coated, fibrous-glass screen cloth shall conform to Federal Specification L-S-125, bronze or aluminum color.

(2) Nails, brads, and staples shall conform to Federal Specification FF-N-103 or FF-N-105. Copper or copper-clad nails and staples shall be used with bronze screen cloth and stainless steel with aluminum screen cloth.

(3) Guards shall be fabricated of 3/4-inch diamond or square-mesh brass, bronze, or aluminum wire, 14-gage, 0.08-inch diameter, crimped, and set in compatible nonferrous channel frame by extending wire through holes in the web and clinching in opposite directions between channel flanges. Channel frame shall be approximately 3/8 inch wide. Corners shall be welded. The following material of 1-½-inch mesh fabricated into ½-inch channel frme may be used: bronze, aluminum, or corrosion-resisting steel, double-crimped or quarter-twist, ¼-inch by 0.029 inch flat wire; bronze or corrosion-resisting-steel woven wire, square or diagonal mesh, 0.0625-inch diameter round wire; aluminum wire, round-edge, flat, 5/16 inch by 0.062 inch thick; brass, bronze, or aluminum woven flat wire, 9/32 inch by 0.0375 inch thick. Bronze guards shall be used with bronze screens. aluminum or corrosion-resisting-steel guards shall be used with aluminum screens. Bronze, corrosion-resisting-steel, or aluminum guards shall be used with plastic-coated, fibrous-glass screens.

(4) Installation shall include trimming and fitting necessary Hardware specified in SECTION: HARDWARE, BUILDERS' shall be accurately and securely applied and left in proper working order.

(5) Painting and finishing of doors, shall be as specified in SECTION: PAINTING, GENERAL.

7-14 INTERIOR FINISH: Unless indicated otherwise, interior finish shall be of the thicknessed and widths hereinafter specified.

a. General: Interior finish shall be machine sanded at the mill and sandpapered smooth at the building when installed. Except where special profiles are shown, interior trim shall be standard-stock moldings and members conforming to the following requirements, and of approved design and type. Interior trim shall be run with hollow backs. Joints shall be made in an approved manner to conceal shrinkage and shall be tight, Trim shall be secured with fine finishing nails and with screws and glue where required. Nails shall be set for putty stopping. Wood finish shall be set straight, plumb or level, in perfect alinement, and shall be closely fitted. Trim, shall be in single lengths. Cores of veneered work shall be nonresinous wood. Laminated panels shall have grain in adjoining layers crossed. Moldings shall be mitered at exterior corners and coped at interior angles. Details will be furnished for interior wood finish where necessary, and the work shall be done in accordance with such details. Trim shall be nailed to grounds and drawn tight against finished surfaces.

b. Species of lumber used for interior finish shall be Philippine mahogany.

c. Grades of lumber used shall be the highest grade of the species for stain or natural finish and the second grade for paint. finish. Wood for stain or natural finish shall be uniform in color.

7-15 PLASTIC LAMINATE for closet doors and counters shall be plastic laminate die of the thicknesses indicated on the drawings for each application. Plastic laminate pattern shall be as approved. Plastic laminate counter shall be secured blind and connected with metal splines at joints as recommended by the manufacturer. All vertical plastic laminate facings shall show vertical grain. Plastic laminate shall be glued to the backing by the method recommended by the manufacturer.

7-16 SHELVING: All exposed edges of shelves shall receive hardwood edgestrips. Shelves shall be of species and dimensions indicated.

7-17 CLOSET DRAWERS shall be constructed to the details indicated.

7-18 ACCESS PANELS shall be constructed and installed where indicated or necessary.

a. Access panels in acoustical ceilings: Construct frames for access panels in acoustical ceilings as specified in section ACOUSTICAL TREATMENT.

7-19 MISCELLANEOUS WOODWORK ITEMS shall be provided where indicated on the drawings, or where necessary according to standard building practice.

7-20 HARDWARE: Installation of hardware items specified in SECTION: HARDWARE, BUILDERS' is covered in that section. Other hardware, specified herein, or in section MISCELLANEOUS METALS, shall be carefully fitted, securely attached, and demonstrated to work freely. Care shall be exercised not to mar or injure the work.

7-21 PRIMING: Millwork, except work to receive stain and natural finish, shall be primed as specified in SECTION: PAINTING, GENERAL.

SECTION 8

PLASTER WORK

8-01 SCOPE: This section covers lathing and plastering work, complete.

8-02 APPLICABLE PUBLICATIONS: The following publications and standards, of the issues listed below but referred to thereafter by basic designation only, form a part of this specification:

a. Federal Specifications:

| | |
|---|---|
| FF-N-105a & Int. Am. 2 | Nails, Wire, Brads, and Staples. |
| QQ-B-101c | Bases, Metal; (for) Plaster and Stucco. |
| QQ-W-461f | Wire; Steel, Carbon (Round, Bare and Coated). |
| SS-C-00192e | Cement; Portland. |
| SS-L-351 | Lime, Hydrated, for Structural Purposes. |
| SS-Q-351 | Quicklime; (for) structural Purposes. |

b. American Society for Testing and Materials Standards:

| | |
|---|---|
| C 29-60 | Standard Method of Test for Unit Weight of Aggregate. |
| C 110-58 | Standard Methods of Physical Testing of Quicklime and Hydrated Lime. |
| C 136-63 | Method of Test for Sieve or Screen Analysis of Fine and Coarse Aggregates. |

8-03 GENERAL: Portland-cement plaster herein specified shall be installed in the locations shown on the drawings. Plastered walls shall include partitions, piers, columns, pilasters, plastered jambs and other returns, reveals, and backs of recesses and alcoves, and jambs and heads of windows and doors, unless otherwise specified or shown on the drawings. Plaster on walls, except the finish coat, shall be carried to the floor, cabinets, or other fixed equipment. The finish coat of plaster shall not be applied on walls having tile wainscots until after the wainscots have been installed.

8-04 MATERIALS:

a. Tie wire shall be annealed wire conforming to Federal Specification QQ-W-461, grade FS 1020, finish 4, type 3. Tie wire for securing metal lath to supports and for lacing shall be not less than 0.0475 inch in diameter (18 gage).

b. Nails: Where metal lath is applied over sheathing, metal, masonry or concrete surfaces, and approved type of furring nail which will permit the formation of plaster keys not less than 1/4 inch in thickness between the metal lath and the backing shall be used.

c. Lime:

(1) Hydrated lime shall conform to Federal Specification SS-L-351, type F, with the further requirement that the total free (unhydrated) calcium oxide (Ca)) and magnesium oxide (MaO) shall not exceed 8 percent by weight, calculated on the "as received" basis.

(2) Quicklime (pulverized) shall conform to Federal Specification SS-Q-351, type C (or type M). Pulverized quicklime shall pass a No.20 sieve, and at least 90 percent shall pass a No.50 sieve. Only one brand shall be used throughout the work. After slaking to a putty, the pulverized quicklime shall have a plasticity figure of not less than 200 when tested in accordance with ASTM Standard Methods of Test C 11e, and at the end of 72 hours the total free (unhydrated) calcium oxide (CaO) and magnesium oxide (MaO) in the hydrated product shall not exceed 8 percent by weight, calculated on the basis of the lime solids in the putty.

d. Lime putty shall be made from hydrated lime, except that quicklime may be used when adequate time and facilities are available for aging. Suitable precautions shall be taken to protect the putty from exposure to the sun and to prevent excessive evaporation when stored. Lime putty prepared from quicklime shall be allowed to cool completaly before using. Lime putty shall be prepared as follows:

(1) Hydrated lime shall be machine-mixed with water to form a putty and shall be allowed to stand for at least 15 minutes before using.

(2) Quicklime (pulverized) shall be slaked in suitable large batches and with enough water to form a thick cream. The slaked quicklime shall be passed through a No.10 sieve and stored for at least 72 hours before using. When the use of lump quicklime, slaked on the job, in lieu of pulverized quicklime is specifically approved for plastering, the cooling and aging period shall be not less than 14 days.

e. Metal Corner Beads:

(1) Corner Beads:

(a) Expansion or perforated corner beads shall be not lighter than 26-gage galvanized metal, shall be formed with a bead not exceeding 3/16-inch and shall have flanges at least 2-1/2 inches wide.

(b) Bull-nose corner beads shall be not lighter than 26-gage galvanized metal weighing not less than 340 pounds per 1,000 lineal feet, shall be formed with a bead having a radius of 3/4-inch and shall have expanded-metal wings at least 2-1/2 inches wide.

f. Metal lath shall conform to Federal Specification QQ-B-101, type F, as hereinafter specified. Type F expanded metal lath shall be cut from copper-bearing steel sheets, shall be hot-dip galvanized after fabrication and shall weigh not less than 3.4 pounds per square yard.

g. Plaster-Base Accessories:

(1) Corner lath shall be strips of galvanized or painted expanded metal 6 inches wide, bent to form two 3-inch wings, and weighing not less than 2.5 pounds per square yard.

(2) Strip lath shall be painted expanded metal not less than 3 inches wide, and weighing at least 2.5 pounds per square yard.

h. Portland cement shall conform to Federal Specification SS-C-192, type I. Only one brand shall be used in the work.

i. Aggregate shall be as specified in the section on CONCRETE of these specifications.

j. Water shall be clean and free from oils, acids, alkalis and organic or other injurious matter.

8-05 SAMPLES OR DESCRIPTIVE DATA and methods of installation of materials shall be submitted to the Contracting Officer for testing and approval. Testing will be done in accordance with the applicable specifications. The cost of the first test will be borne by the Government. If the sample fails to meet specification requirements, the material represented by the sample shall be replaced, and the cost of retesting will be deducted from the payments due the Contractor at the rate of $35 per sample retested.

8-06 STORAGE OF MATERIALS: Cement and lime shall be stored off the ground under watertight cover and away from sweating walls and other damp surfaces until ready for use. Damaged or deteriorated materials shall be removed from the premises.

8-07 INSTALLATION:

a. Base screeds shall be placed 4 inches above the finished floor, unless otherwise shown on the drawings. The screeds shall be set

level and true to line. Base screeds shall be installed in lengths as long as practicable, and shall have the joints in straight runs alined with suitably formed splice or tie plates. Screeds applied on metal lath shall be secured with tie wire. Where the structural backing is concrete or masonry, the base screeds shall be secured with galvanized nails or drivescrews driven into fiber plugs set in the masonry, by machine screws in lead-sleeve anchorage units set in the masonry, or by other methods approved by the Contracting Officer. Fastenings shall be spaced not more than 12 inches on centers.

b. Corner beads shall be provided on external plaster corners, including plastered jambs and heads of recessed door openings, windows and all other plastered corners. Corner beads shall be in single lengths where the length of a corner or jamb does not exceed the standard stock lengths. The beads shall be neatly mitered or coped at corners, and shall be securely fastened with tie wire, galvanized staples or offset-head or hook-head nails, spaced not more than 8 inches on centers and staggered on the two wings.

c. Corner lath: Where plaster finish is required, corner lath shall be installed in the following locations:

(1) At interior angles where the abutting surfaces are of different materials.

(2) At interior angles where the abutting surfaces are metal lath, except where flat-base metal lath, type F, is continued around the corner not less than 3 inches.

(3) At interior angles where both abutting surfaces are of concrete masonry units, not bonded with each other.

Corner lath shall be tied securely to abutting lathed surfaces at the outer edges only. Corner lath shall be fastened to masonry and concrete surfaces as specified above for the fastening of base screeds and corner beads.

d. Metal lath shall be applied in such manner as to form true surfaces without sags or buckles, and with the long dimension of the lath at right angles to the direction of the supports. Metal lath shall be applied with the lower sheet lapping over the upper sheet. Metal lath shall be secured to supports at intervals not exceeding 6 inches. The side laps of lath shall be secured to supports and tied at intervals not exceeding 9 inches between supports. Type F expanded metal lath shall be used over vertical and horizontal supports spaced up to and including 16 inches on centers.

(1) Flat-base lath (type F) shall be lapped at the sides not less than 1/2 inch. Adjoining sheets of small-opening lath shall be lapped at the ends not less than 1 inch, and such laps shall be staggered and, in all cases, shall occur only over supports. The end of all flat-lath sheets shall be at least one support distant from any angle or corner, and the sheet shall be bent into the re-entrant angle or around the corner; otherwise, corner lath shall be used.

e. Strip lath not less than 3 inches wide shall be installed over joints between dissimilar base materials where the surfaces to be plastered lie in the same plane and where the base materials cannot be effectively bonded or tied together.

8-08 MIXING OF PLASTER: Except where hand-mixing of small batches is approved by the Contracting Officer, mechanical mixers of an approved type shall be used for the mixing of plaster. Caked or lumped materials shall not be used. Mechanical mixers, mixing boxes and tools shall be cleaned after mixing each batch and kept free of plaster from previous mixes. Plaster shall be mixed thoroughly with the proper amount of water until uniform in color and consistency. Retempering will not be permitted, and all plaster which has begun to stiffen shall be discarded.

8-09 PROPORTIONING OF PLASTER: Portland-cement plaster shall be mixed by volume in the proportion of one part cement, 3 parts fine aggregate and 1/4 part lime putty.

8-10 APPLICATION OF PLASTER: Properly regulated ventilation shall be provided. Masonry surfaces on which suction must be reduced shall be dampened with a fog spray. Unless otherwise indicated on the drawings or specified, the scratch and brown coats shall be carried down to the floor. Finish coats shall have a reasonably uniform thickness or approximately 1/8 inch, and the minimum thickness at any point shall be 1/16 inch. The thickness of plaster, from the face of the plaster to the finished plaster surface shall be 3/4 inch on the interior faces of exterior walls and over metal lath, and not less than 1/2 inch elsewhere. 3/4 inch plaster shall be 3-coat work, and 1/2 inch plaster shall be 2-coat work. Plaster corners above bullnose facing tile wainscots shall be neatly molded to the radius of the facing tile and formed flush therewith, or shall be formed with bullnose corner beads.

a. Scratch coat shall be applied for both ceramic tile application and for finish plaster coats. Scratch coat shall be full and thick and shall be applied with sufficient force to form good keys. The scratch coat shall be cross-scratched upon attaining its initial set and shall be kept damp with a fog spray. On concrete and masonry surfaces (except where plaster is 3/4 inch thick), the scratch coat shall be doubled back with the same mix, straightened to a true surface and left ready for the finish coat.

b. Brown coat shall be applied after the scratch coat has set, but not less than 24 hours after the application of the scratch coat. When applied directly to masonry, the brown coat shall be applied with sufficient pressure to prevent air pockets and secure a good bond. The brown coat shall be lightly scratched and broomed, shall be kept moist with a fog spray for 2 days and then shall be allowed to dry out.

c. Finish coat shall not be applied until the brown coat has seasoned for 7 days. Just before application of the finish coat, the brown coat shall again be wetted evenly with a fog spray. The finish coat shall be first floated to a true and even surface, then given a sand float finish of a uniform texture as approved by the Contracting Officer. The finish coat shall be kept moist with a fog spray for at least 2 days and thereafter shall be protected against rapid drying until properly and thoroughly cured.

8-11 EXTERIOR PLASTER: Exterior plaster shall be applied to exterior surfaces affected by work under this contract.

a. Proportioning of Exterior Plaster: 1 part cement to 3 parts sand.

b. Application of Exterior Plaster shall be in 3 coats with a total thickness of 3/4 inch as specified for interior plaster. Finish coat shall be treated as the existing shotcrete.

8-12 SAMPLING OF PLASTER: Samples may be taken by the Contracting Officer at any time from plaster work in place. Areas represented by samples which show oversanding will be rejected.

8-13 PATCHING: Plaster containing cracks, blisters, pits, checks, or discoloration will not be acceptable. Such plaster shall be removed and replaced with plaster conforming to this specification and approved by the Contracting Officer. Patching of defective work will be permitted only when approved by the Contracting Officer, and such patching shall match existing work in texture and color.

8-14 CLEANING UP: After completion of the lathing and plastering work, the contractor shall promptly remove all surplus materials, equipment, and debris remaining from his operation.

## SECTION 9

## TILE WORK, CERAMIC:

9-01 SCOPE: This section covers the installation of ceramic tile, complete.

9-02 WORK NOT INCLUDED: Scratch coat for wall tiles is specified in section PLASTER WORK.

9-03 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification:

a. Federal Specifications:

| | |
|---|---|
| QQ-B-101c (1) | Bases, Metal; (for) Plaster and Stucco Construction. |
| SS-C-00192e | Cement, Portland. |
| SS-T-308b | Tile, Ceramic; Floor, Wall and Trimmers. |
| TT-C-598a(1) | Caulking Compound, Oil & Resin Base Type (for Masonry & Other Structures). |
| VV-W-95 | Wax, Paraffin, Technical. |

b. American Society for Testing and Materials Standards:

| | |
|---|---|
| A 82-62T | Cold-Drawn Steel Wire for Concrete Reinforcement. |
| A 185-64 | Welded Steel Wire Fabric for Concrete Reinforcement. |
| C 144-63T | Aggregate for Masonry Mortar. |

c. American Standards Association Standards:

| | |
|---|---|
| A 108.1-1958<br>A 108.2-1958<br>A 108.3-1958 | Standard Specifications for<br>Glazed Ceramic Wall Tile,<br>Ceramic Mosaic Tile,<br>Quarry Tile and Pavers<br>Installed in Portland<br>Cement Mortars. |

9-04 GENERAL: Work required under this section of the specifications shall not be performed unless the ambient temperature of the area in which the work occurs is at least 50 degrees F., and rising. Adequate ventilation shall be provided to take off fumes. All ceramic tile work shall be performed in accordance with ASA Standard A-108 unless otherwise specified herein.

9-05 MATERIALS: Manufacturer's original containers, bundles, or packages shall be delivered to the project site unopened, with seals unbroken and labels intact, and shall not be opened until inspected by the Contracting Officer. Materials shall conform to the respective specifications and other requirements specified below:

a. Asphalt-saturated felt: Federal Specification HH-F-191, type I.

b. Calking compound: Federal Specification TT-C-598, grade 1.

c. Mortars and Mixes:

(1) Float coat for wall tile: ASA A 108.1-2.1b

(2) Grout for wall tile: ASA A 108.1-2.2

(3) Setting Beds for quarry floor tile: ASA A 108.3-3.3a.

(4) Mortars and grout for quarry floor tile: ASA A 108.3-3.3b.

(5) Dope coat for quarry floor tile: ASA A 108.3-2.1c.

d. Portland cement: Federal Specification SS-C-192, type I.

e. Reinforcement in setting beds shall confom to ASTM A 185, 2"x2" mesh of No. 16 gage steel wire conforming to ASTM A 82.

f. Sand: Clean and graded, conforming to ASTM Specification C 144.

g. Tile: Federal Specification SS-T-308. Labels shall be kept intact. Sizes specified are nominal.

(1) Glazed ceramic wall tile and trimmers for wall facings and wainscots shall be approximately 3/8-inch thick. Glazed wall tile shall be type II, class G, 4¼"x 4¼" square, and trimmers shall be type III, class M. Stops, returns, trimmers, caps and special shapes shall be provided as required for sills, jambs, recesses, offsets, and other conditions so as to provide a complete and neatly finished installation. Colors shall be as selected from manufacturer's standard colors and approved by the Contracting Officer.

(2) Quarry tile shall be type I, class C, with plain face, 4"x4" in size, ½ inch thick, color as selected from manufacturer's standard colors and approved by the Contracting Officer.

h. Water shall be clean and free from injurious amounts of oil, acids, soluble salts, and organic impurities.

9-06 SAMPLES of all materials proposed for use shall be submitted to the Contracting Officer for testing and approval before materials are purchased and/or delivered to the project site. Testing will be done by the Government in accordance with the applicable specifications. The cost of the first test will be borne by the Government. If the sample fails to meet specification requirements, the material represented by the sample shall be replaced, and the cost of retesting will be deducted from the payments due the Contractor at the rate of $35 per sample retested.

9-07 INSTALLATION OF FLOOR TILE:

a. Preparation of Floor Slab and waterproofing: Is specified in section ROOFING & WATERPROOFING.

b. Installation of quarry floor tile: Setting bed and tiles shall be installed to true planes, sloped to drain, in accordance with the requirements of ASA A 108.3-3.

(1) Expansion Joints. 3/8" thick, shall be provided between tile flooring and butting vertical surfaces. The joints shall extend completely through tile and setting bed.

(2) Setting Bed: Reinforcement shall be placed in center of setting bed and lapped at least 2". Laps shall be tied with galvanized 18-gage wire not more than 10" on centers.

(3) Setting: Tiles shall be laid out from the center line of each space. Joints shall be not more than ¼" wide and shall be of uniform width throughout.

(4) Grouting: Grout shall be filled flush and tooled smooth.

c. Curing: 3 days' moist curing.

d. Protection: 1" thick boards over entire tiled area while construction is in progress.

9-08 INSTALLATION OF WALL TILE shall be in accordance with the requirements of ASA A 108.1-1 and A 108.1-2.

a. Scratch coat is specified in section PLASTER WORK.

b. Cutting, fitting, and setting accessories: ASA A 108.1-1.11. Ceramic soap dishes, hooks, and toilet paper holders shall be installed to heights specified section BATHROOM & TOILET ACCESSORIES.

c. Setting bed: ASA A 108.1-2.5a. to d.

d. Application: ASA A 108.1-2.6. Tiles shall be laid out from center lines of each wall, except that consideration shall be taken for centering of medicine cabinets over lavatories. Joint widths shall not exceed 1/16-inch.

e. Grouting: ASA 108.1-2.7. Joints between wall tile and plumbing or other built-in fixtures shall be made with a light-colored calking compound.

f. Curing: If necessary, provide dampness for curing.

9-09 CLEANING: Upon completion, tile floor and wall surfaces shall be thoroughly cleaned in a manner not to affect tile surfaces.

9-10 PROTECTION AND ACCEPTANCE: All tile work shall be properly protected during subsequent building operations. Damaged and improperly applied tiles shall be replaced at the expense of the contractor prior to final acceptance of the work.

SECTION 10

ACOUSTICAL TREATMENT

10-01 SCOPE: This section covers the installation of acoustical treatment, complete.

10-02 APPLICABLE PUBLICATIONS: The following publications form a part of this specification to the extent indicated by references thereto:

a. Federal Specifications:

| | |
|---|---|
| SS-A-00118c | Acoustical-Units; Prefabricated. |
| TT-C-598a (1) | Caulking Compound, Oil & Resin Base Type (for Masonry and Other Structures). |

b. American Society for Testing and Materials Standards:

| | |
|---|---|
| C 423-60T | Sound Absorption of Acoustical Materials in Reverberation Rooms (Tentative). |
| E-84-61 | Surface Burning Characteristics of Building Materials. |

c. Acoustical Materials Association Publication:

Sound Absorption Coefficients of Architectural Acoustical Materials (Bulletin XXIV, 1964).

10-03 GENERAL: Acoustical treatment shall be applied at the locations indicated on the drawings by skilled mechanics experienced in this type of work. No portions of the suspension system shall pass through ductwork. The contractor shall furnish all necessary scaffolds.

a. Classifications:

1. Flame resistance: Classified from "A" to "D" by criteria in FS SS-A-118.

2. Flame spread: Classified from "I" to "IIV" in AMA bulletin XXIV, 1964, from criteria in ASTM E84.

3. Light reflectance: Classified from "a" to "d" in AMA bulletin XXIV from criteria in the Transactions of the Illuminating Engineering Society, Vol. 33, page 379.

4. Noise reduction coefficient: The arithmetical average of sound absorption coefficients from 250 to 2000 cycles, inclusive, calculated in accordance with ASTM C423-60T as explained in AMA bulletin XXIV, 1964.

b. Mounting system: Units shall be mounted on asbestos--cement boards applied on metal furring channels. Asbestos-cement boards are specified in section CARPENTRY. Furring channees are specified in specified in section MISCELLANEOUS METALS.

e. Access panels to furred spaces shall be provided where shown on the drawings or as directed.

10-04 MATERIALS:

a. Acoustical units: All units shall be treated to prevent fungus growth. 12-inches-by-24-inch units shall be 3/4-inch thick. They shall have fissured design. Edges shall be beveled. Flame resistance: Class "C"; noise reduction coefficient: .65 minimum; light reflectance: Class "a". Tiles shall be factory - painted an off-white color over the entire exposed surface, including bevels.

b. Screws for acoustical tile shall be aluminum, stainless steel, stainless steel, or barss, 1-1/4" #3 round-head wood screws.

10-05 SAMPLES: 3 samples of acoustical tile and of screws shall be submitted to the Contracting Officer for approval prior to purchase and/or delivery of materials to the site.

10-06 SHOP DRAWINGS of the acoustical installations shall be submitted to the Contracting Officer for approval. Material shall not be purchased and/or delivered to the site before the approved shop drawings have been returned to the Contractor.

10-07 INSTALLATION: Acoustical tile shall be laid out in symmetry about the centerlines of each room or space, unless otherwise indicated, in a manner that will ensure the minimum of cutting. During erection the joints around electrical outlets, ducts, pipes, and other work extending through the acoustical units, except joints with light fixtures, diffusers and registers, shall be sealed with plastic caulking compound. Following completion of the acoustical work, all joints shall be straight and true to line, and the exposed surfaces shall be flush and level. Tile units shall be tightly butted, and corners and arrises shall be full and without worn or broken places. tiles shall be screwed to the asbestos-cement boards in an approved manner using screws at each corner, at midpoints, and adjacent to score line. Units shall be neatly jointed to connecting work. The contractor shall cooperate with the trades concerned to ensure that flanges of light fixtures completely cover edges of tiles unless otherwise directed. Suitable wood moldings shall be provided along the perimeter of each room or space unless otherwise directed. Moldings shallbe painted in a color to match the color of the acoustical tile.

10-08 ACCESS PANELS: One removable access panel not less than 12 by 12 inches nor more than 12 by 24 inches in size and of the same construction, appearance, and finish as adjacent and adjoining acoustical units shall be provided and installed directly below each valve that is located above the ceiling and would otherwise not be accessible. Exact locations shall be as directed. General access panels, 24 by 24 inches, shall be made as and where shown on the drawings, or as directed.

10-09 COMMENCEMENT OF APPLICATION: Acoustical tile shall not be installed until all windows and doors are in place and glazed. All interior wet or dust producing work, such as concrete, masonry, plaster, and terrazzo work, shall be complete and dry.

10-10 CLEANING: Following erection, dirty or discolored surfaces of acoustical units shall be cleaned and left free from defects. Units that are damaged or improperly applied shall be removed and replaced as directed without additional cost to the Government. The contractor shall remove all debris from the building and clean or repair any part of the construction or finish surfaces stained, soiled, or damaged by his operations.

SECTION 11

CALKING

11-01 SCOPE: The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances, and materials, not furnished by the Government, and in performing all operations in connection with the application of calking, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

11-02 WORK NOT INCLUDED: This section does not include calking occurring in connection with joints in concrete floors and roofing.

11-03 APPLICABLE SPECIFICATIONS: The following specification forms a part of this specification:

| | |
|---|---|
| TT-C-00598a(1) | Caulking Compound, Oil & Resin Base Type, (for Masonry & Other Structures). |

11-04 MATERIALS: Materials shall conform to the following requirements:

a. Calking Compound shall conform to the requirements of Federal Specification TT-C-598, grade 1. Calking compound for joints between concrete and aluminum members shall be of a type specially made for these materials. The color of the calking compound shall match the color of the mortar joints. Delivery of the calking compound to the building site shall be in the manufacturer's original sealed packages.

b. Sealer for the joint grooves in masonry shall be a quick-drying liquid, and of a type and consistency recommended by the Manufacturer of the calking compound.

c. Rope Yarn shall be the raveled strands of rope fiber free from oil or other staining element.

11-05 SAMPLES: Before the work of application is started, samples of all materials proposed for use shall be submitted to the Contracting Officer for approval.

11-06 APPLICATION: Calking shall be installed in joints around wood or metal frames built into masonry or concrete walls, and in any other joints so indicated on the drawings and as specified under other sections of these specifications. Calking compound shall be applied by the gun method using nozzles of proper sizes to fit the several widths of the joints. The type of gun shall be subject to approval by the Contracting Officer.

a. Preparation: Calking in joints shall be minimum of 3/4 inch in depth and 1/4 inch in width unless otherwise indicated on the drawings. Where adequate grooves for calking have not been provided, grooves shall be prepared by cutting out the mortar to the minimum depth and by grinding to the minimum width, taking care that adjoining metal work is not reduced in section. All particles of mortar, dust, and other foreign matter shall be brushed out and, just prior to calking, the joint grooves shall be coated with an application of sealer. Where a suitable mortar backstop has not been provided, the back of joint grooves shall be packed tightly with rope yarn.

b. Calking: The compound shall be driven into the joint grooves with sufficient pressure to force out all air and to solidly fill the joint grooves. Calking, where exposed, shall be free of wrinkles, and shall be uniformly smooth. Joints in precast sills and other wash surfaces shall be filled slightly convex to obtain flush joint when dry. Calking around all openings in masonry shall include the entire perimeter of each opening. Upon completion of the calking, any calked joints not entirely filled shall be roughened and filled as specified and the exposed surface tooled smooth.

SECTION 12

GLASS WORK

12-01 SCOPE: This section of the specifications covers glazing work, complete.

12-02 APPLICABLE PUBLICATIONS: The following publications, of the issues listed below but referred to thereafter by basic designation only, form a part of this specification:

a. Federal Specifications:

| | |
|---|---|
| DD-G-451a(1) | Glass; Flat and Corrugated, for Glazing, Mirrors and Other Uses. |
| TT-G-00410b (GSA-FSS) | Glazing Compound, Sash (Metal) for Back Bedding and Face Glazing. |

b. Flat Glass Jobbers Association Publication:

Glazing Manual (1958).

12-03 GENERAL: Unless otherwise specified herein all glazing work shall be performed in strict accordance with the applicable specifications and instructions contained in the Glazing Manual of the Flat Glass Jobbers Association. The sizes of glass indicated on the drawings are approximate only, and the actual sizes required shall be determined by measuring the frames to receive the glass. All glass shall be factory labeled on each pane or block, and labels shall not be removed until final approval is obtained. Clear sheet glass shall be used throughout except in bath rooms where the two lower lights of each sash shall be glazed with obscure sheet glass.

a. Inspection of sash shall be made by the contractor prior to installation of glass to verify that the sash is ready for glazing: The sash shall be plumb, square, and adjusted, with hardware in place. All rivets, screws, bolts, welding fillets, and other projections shall be removed from the clearances in glazing rabbets. All sash corners and fabrication intersections shall be sealed to make sash weather-tight. No glazing work shall be commenced until all sash to be glazed in one operation has been found to be satisfactory to the contractor.

12-04 MATERIALS:

a. Flat glass of the following kinds shall conform to Federal Specification DD-G-451, types as noted.

(1) Clear sheet glass shall be type II, A quality, not less than 7/32-inch thick.

(2) Obscure sheet glass shall be type II, B quality, not less than 7/32-inch thick.

b. Glazing compound for sash glazing shall conform to Federal Specifications TT-G-410, and shall be an elastic glazing compound having a composition and color particularly adapted for aluminum and requiring no painting.

c. Oakum shall be a commercially manufactured, nonstaining type, treated to prevent mildew and dry rot and approved by the Contracting Officer.

12-05 SAMPLES: Samples of glass, size 10 inches by 12 inches, and of glazing compound shall be submitted to the Contracting Officer for inspection and approval prior to purchase and delivery of material represented by the samples to the site.

12-06 REMOVAL OF EXISTING GLASS: Glass in existing windows that are to be relocated may be re-used at the new location. The glass shall be removed by skilled glass jobbers prior to dismantling of the sash and shall be stored at a safe place until re-installation. Glass damaged during removal or storage shall be replaced at the Contractor's expense with glass conforming to these specifications.

12-07 GLAZING CLEARANCES:

a. At perimeter on all four sides: Equal to the glass thickness.

b. Indoors and outdoors on all four sides: Not less than 1/16-inch plus glass and sash tolerance and at least equal to the minimum recommendation of the Manufacturer of the glazing compound (usually at least 1/8-inch).

12-08 GLAZING INSTALLATION.

a. Preparation:

(1) Preparation of sash: Grease and lacquer or other organic protective finishes shall be removed from the glazing rabbet area of aluminum sash with a methyl ethyl keytone (MEX) or similar approved solvent material which will not etch or mar the aluminum finish.

(2) Preparation of glass: Check dimensions related to sash openings to ensure specified clearances. Clean sealing surfaces at perimeter before application of compound.

b. Installation: Glass not otherwise specidied shall be bedded in glazing compound and face-puttied with the glazing compound. Sashes shall be fixed so that they cannot be moved until glazing compound has set. Glass shall be centered in glazing rabbet to maintain the recommended clearances at perimeter on all four sides and indocrs and out, and shall be secured with glazing angle clips specified under ALUMINUM WINDOWS, AND

ASSOCIATED WORK. Glass in wood doors shall be bedded in putty and secured with wood glazing strips.

12-09 ACCEPTANCE: Glass shall be protected against damage. After inspection any labels, paint smears and spots shall be removed from the glass, and the glass shall be washed clean. Damaged or broken glass shall be removed and replaced before acceptance, at no expense to the Government.

SECTION 13

RESILIENT TILE FLOORING

13-01 SCOPE: This section covers installation of vinyl-asbestos tile flooring where indicated, and replacement of existing asphalt tiles damaged during the work, complete.

13-02 APPLICABLE PUBLICATIONS: The following publications form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

| | |
|---|---|
| L-T-00345. (COM-NBS) | Tile: Floor, Vinyl-Asbestos. |
| P-W-155a. | Wax, Floor, Water-Emulsion, Slip-Resistant. |
| QQ-B-613b | Brass, Leaded and Non-Leaded; Flat Products (Plate, Bar, Sheet and Strip). |
| SS-A-128 | Adhesive, Asphalt, Cut-Back Type (For Asphalt Tile). |
| SS-A-00138 (GSA-FSS) | Adhesive; Asphalt, Water Emulsion Type (For Asphalt Tile). |
| SS-T-306b | Tile, Floor, Asphalt |
| SS-W-0040(1) (GSA-FSS) | Wall Base, Rubber & Wall Base, Vinyl Plastic. |

13-03 GENERAL: Vinyl-asbestos tile shall be installed in the spaces indicated on the drawings. Materials shall be stored at a minimum temperature of 75 degrees F. for at least 24 hours before installation. In spaces where tile is being installed, a temperature of at least 75 degrees F. shall be maintained from 48 hours before installation until 48 hours after installation. Adequate ventilation shall be provided to remove moisture and volatile fumes. Unless otherwise specified, materials and methods used shall be in strict accordance with the recommendations of the manufacturer of the tile. Materials shall be delivered to the project site in the manufacturer's original unopened containers with the manufacturer's brand and name clearly marked thereon.

a. Design: Design and lay-out of floor patterns shall be as decided by the Contracting Officer on the basis of approved samples.

b. Moisture test for concrete subfloors on or below grade to which tile is to be applied shall be performed as follows: After concrete subfloors have been properly cleaned, small patches of adhesive shall be spread in several locations in each room and allowed to dry or set overnight. It the set adhesive can be peeled easily from the subfloor, the test shall be repeated at weekly intervals until the adhesive adheres properly. When the adhesive adheres tightly to the subfloor, the tile shall be installed.

13-04 MATERIALS:

a. Adhesive may be either emulsion or cutback type conforming to Federal Specification SS-A-136, class 1, or SS-A-126, respectively, or a product recommended by the tile manufacturer. Adhesive for bases shall be a water-resistant product recommended by the base manufacturer.

b. Asphalt tile (for replacement) shall conform to Federal Specification SS-T-306; thickness, pattern, color, and size as existing tile.

c. Base shall be vinyl plastic, 4" high, conforming to Federal Specification SS-W-40.

d. Edge strips shall be ¼-inch thick brass plate conforming to Federal Specification QQ-B-613a. Edge strips shall be at least 3/4-inch wide, butt type and rounded or beveled on the exposed edge. Strips shall be drilled for flathead screws on 6-inch centers.

e. Primer may be either the emulsion or cutback adhesive specified hereinbefore, thinned to the approximate consistency of heavy paint by the addition of water to the emulsion or light volatile solvent to the cutback adhesives or a product recommended by the tile manufacturer. Emulsion-type primer shall be used with emulsion-type cement, and cutback-type primer shall be used with cutback-type cement.

f. Vinyl-asbestos tile shall conform to Federal Specification L -T-345, 12 inches square. Color shall be selected by the Contracting Officer from the manufacturer's stock colors.

g. Wax shall conform to Federal Specification P-W-155, 16 percent concentration.

13-05 SAMPLES shall be submitted to the Contracting Officer for approval before delivery of any material to the project site. Three sample tiles shall be furnished for each of the manufacturer's stock colors selected for the project. Additional samples for check testing may be selected from the materials delivered to the project site. In the case of tile, the cost of the first check test only will be borne by the Government. If the sample fails to meet all the requirements of the specification, the material represented by the sample shall be replaced, and the cost of retesting will be deducted from the payments due the contractor at the rate of $50.00 per sample retested.

13-06 PREPARATION OF SUBFLOOR: Surfaces to receive vinyl tile shall be swept clean and shall be free from moisture, paint, oil, and wax. Surfaces of recessed electrical outlet covers and other utility covers in the floor to receive vinyl tile shall be thoroughly cleaned and checked for proper fit and alinement. Concrete floors shall have cracks, rough areas, or other surface defects filled with plastic materila. Ridges, trowel marks, and other surface projections shall be ground smooth.

13-07 INSTALLATION OF TILE:

a. Primer shall be applied to concrete floors in such a manner that the entire surface to receive tile will be evenly covered. The specific method of application shall be in accordance with the tile manufacturer's recommended practice.

b. Adhesive shall be applied after the primer has been allowed to dry thoroughly. Method of application and time allowed for setting shall be in accordance with tile manufacturer's recommendations.

c. Tile shall be laid in accordance with the chosen design layout starting from axes that will produce opposite borders of equal width and not less than half the tile width. Entire undersurface of the tile shall be bonded to the floor, with each tile in tight contact with surrounding tiles and with joints alined with room axes. The direction of graining in adjacent marbleized tiles shall be changed. The position of graining and the color of tile in recessed electrical outlet box and similar items shall match that of adjacent floor tile. Immediately after vinyl-asbestos tile has been laid, floors shall be thoroughly rolled with a three-section roller weighing not less than 100 pounds.

d. Edge strips shall be installed at entire perimeter of each floor abutting ceramic tile base, at exposed edges of vinyl tile flooring where thresholds are not required, and at joints with dissimilar flooring material. The top surface shall be flush with the vinyl tile floor. Strips shall be secured to concrete with suitable anchors.

13-08 CLEANING: Immediately upon completion of tile installation in a room or an area, floors and adjacent surfaces shall be dry-cleaned with an approved cleaner to remove surplus adhesive and other soiling. Floors shall not be washed for at least 5 days after installation, after which time they shall be washed with an approved nonalkaline cleaning solution rinsed thoroughly with clear, cold water, and given two coats of water-emulsion wax conforming to Federal Specification P-W-155. After each wax coat, floors shall be buffed to an even luster with an electric polishing machine.

13-09 PROTECTION: From the time of cleaning until acceptance by the Government, the tile shall be covered with clean, heavy-duty building paper before traffic is permitted. Vegetable-fiber board, plywood or other suitable material that will not mar the tile shall be placed over tile in areas used as passageways by workmen, in areas subject to floor damage because of subsequent building operations, and elsewhere, as directed.

# SECTION 14

## BATHROOM & TOILET ACCESSORIES

**14-01** SCOPE: This section covers bath room and toilet accessories, complete.

**14-02** APPLICABLE SPECIFICATIONS: The following Federal Specifications form a part of this specification to the extent indicated by the references thereto:

| | |
|---|---|
| DD-M-00411a (GSA-FSS) | Mirror, Glass. |
| FF-D-396e | Dispensers, Soap. |
| FF-H-136(1) | Hardware & Fittings; (for) Lavatory Partitions & Inclosures. |
| QQ-S-766c (2) & Int. Am. 3 | Steel; Plates, Sheets, and Strip Corrosion Resisting. |
| SS-T-308b | Tile, Floor, Wall, and Trim Units, Ceramic. |
| WW-P-541b & Int. Am. 6 | Plumbing Fixtures; (for) Land Use. |
| WW-P-00535 | Plumbing Accessories and Medicine Cabinet, Metal (for Military Family Housing). |

**14-03** GENERAL: All bathroom accessories shall be furnished under this section. All metal bathroom accessories, and metal fastening devices shall be installed under this section. Ceramic tile accessories shall be installed under section TILE WORK, CERAMIC.

**14-04** MATERIALS: Brass items shall conform to the requirements of Federal Specification WW-P-541. Corrosion resisting steel shall conform to Federal Specification QQ-S-766a, class 1. Ceramic tile items shall conform to Federal Specification SS-T-308, type II, class G, or type III, class M.

a. Coat hooks: Federal Specification WW-P-535, type IV, twin robe-hooks.

b. Curtains: Translucent plastic, as approved. Curtains shall be have brass reinforcement for hooks. Snap hooks shall be provided with roller bearings for easy movement on curtain rod.

c. Curtain rods: Brass with chrome finish:

(1) For tubs: American Standard No. R 1850-60, or equal.

(2) For shower: To fit enclosure.

d. Hook and bumper for toilet doors: type 4330

e. Medicine cabinets: Federal specification WW-P-535, type IV, 18 inches by 24 inches nominal overall size. Mirror shall be as specified below. Plane-type hinges shall be stainless steel. Cabinet body shall be one-piece construction. 4 plate glass shelves with adjustable brackets shall be furnished with the cabinet.

f. Mirrors shall conform to Federal Specification DD-M-411, class E, except that frame shall be stainless steel. The mirrors shall be 18 inches by 24 inches. Mounting shall be concealed and of the non-tamperable type.

g. Paper towel dispenser cabinets: Federal Specification WW-P-541, type 445, except that it shall be manufactured from stainless steel.

h. Soap dishes shall be ceramic tile:

American Olean No. 401 or equal at showers

American Olean No. 403 or equal at bath room lavatories

i. Soap dispensers: Federal Specification FF-D-396, type I with container, holder, and bracket of stainless steel or brass.

j. Toilet paper holders shall be of ceramic tile:

American Olean No. 553, or equal.

k. Toilet stall standards shall conform to Federal Specification FF-H-136. Standards shall be of wrought brass with chromium plating. All types of lavatory stall standards, indicated with Government type numbers on the drawings or which are necessary for assembly of the toilet partitions, shall be furnished: Bommer, 1100 series, US 26 D.

l. Toilet stall tubing angles and fittings shall be furnished by the manufacturer of the lavatory stall standards to ensure perfect fit. Tubing, wall angles, and other fittings shall be chromium plated brass or bronze: Bommer, 1100 series, US 26 D.

m. Towel bars shall be stainless steel with supports of ceramic tile: American Olean No. 47, or equal. Length: 24-inches.

n. Tumbler and toothbrush holders: American Olean No. 433 or equal.

14-05 FINISHES:

a. Brass or Bronze: US 26

(1) The chromium plating shall be applied over a coating of nickel which is applied over a coating of copper. The thickness of coatings shall conform to the requirements of Federal Specification WW-P-541.

b. Corrosion resisting steel: US 32

c. Ceramic tile: Color and glaze as surrounding wall tile.

14-06 SAMPLES: One sample of each toilet accessory shall be submitted to the Contracting Officer for approval. Approved samples may be installed in the work. Catalog cuts from nationally known manufacturers may be submitted in lieu of samples.

14-07 INSTALLATION: Exposed screw heads shall be oval and of tamperproof design. Specified heights above floor are to center of the accessory and are approximate. Except as hereinafter specified, surface-mounted accessories shall be installed with wood screws in lead or fiber sleeves, with machine screws in metal shields, with molly anchors or with toggle bolts, as required by the construction. Back plates for surface-mounted accessories shall be installed in the same manner or shall be provided with lugs or anchors and set in mortar, as required by the construction.

a. Coat hooks shall be installed 66 inches above the floor.

b. Curtain rods: 78 inches above finished floor.

c. Medicine cabinets and mirrors shall be installed with mirror center 60 inches above the floor.

d. Paper towel cabinets shall be installed where shown on the drawings.

e. Soap dishes: As directed.

f. Soap dispensers shall be installed at each lavatory in the toilet as directed.

g. Toilet paper holders shall be installed 30 inches above the floor.

h. Toilet stall standards, tubing, and fittings shall be installed according to the manufacturer's recommendations at the locations indicated on the drawings.

i. Towel bars: 41" from finished floor to bar center, or as directed.

j. Tumbler & toothbrush holders: As directed

SECTION 15

PAINTING

15-01 SCOPE: This section of the specifications covers painting of BOQ wing and all new work and repairs elsewhere in the FBIS Club-BOQ building affected by work under this contract, complete.

15-02 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification:

a. Federal Specifications:

| | |
|---|---|
| TT-E-489c (4) | Enamel, Alkyd, Gloss, (for Exterior & Interior Surfaces). |
| TT-E-00506d (GSA-FSS) | Enamel, Tints and White, Gloss, Interior. |
| TT-E-508(4) | Enamel; Interior, Semigloss, Tints and White. |
| TT-E-543 | Enamel-Undercoat, Interior, Tints, and White. |
| TT-F-336b(1) | Filler, Wood, Paste. |
| TT-L-00190b (GSA-FSS) | Linseed Oil, Boiled (for Use in Organic Coatings). |
| TT-P-0025b (GSA-FSS) | Primer Coating, Exterior (Undercoat for Wood, Ready-Mixed, White and Tints). |
| TT-P-0029d (GSA-FSS) | Paint, Latex Base, Interior, Flat, White and Tints. |
| TT-P-30b | Paint, Alkyd, Odorless, Interior, Flat, White and Tints. |
| TT-P-31c | Paint, Oil: Iron-Oxide, Ready-Mixed, Red and Brown. |
| TT-P-51e | Paint, Oil, Interior, Flat, White and Tints. |
| TT-P-53c(1) | Paint, Ready-Mixed, Outside, Medium-Chrome-Yellow. |
| TT-P-59c | Paint; Ready-Mixed, International Orange. |
| TT-P-61d | Paint, Exterior, Black, Ready-Mixed. |
| TT-P-71d | Paint, Exterior Chrome-Green, Ready-Mixed. |
| TT-P-81d(2) | Paint, Oil; Ready-mixed, Exterior, Medium Shades on a Lead-Zinc Base. |
| TT-P-102a | Paint, Oil: Titanium-Lead-Zinc and Oil, Exterior, Ready-Mixed, White and Light Tints. |
| TT-P-320a | Pigment, Aluminum; Powder and Paste, for Paint. |
| TT-P-650a(2) | Primer Coating, Latex Base, Interior, White, (for Gypsum Wallboard). |
| TT-V-119 | Varnish, Spar, Phenolic-resin. |
| TT-V-121e | Varnish, Spar, Water-Resisting. |

b. Federal Standard:

| | |
|---|---|
| No. 595 & Int. Change notice No. 1 (Army-CE) | Colors. |

c. Military Specifications:

| | |
|---|---|
| MIL-S-12935B | Sealer, Surface; for Knots. |
| MIL-P-14504A | Primer Coating, Pretreatment, One-Package Wash Primer (for Steel, Aluminum, and Magnesium). |
| MIL-P-15328B | Coating, Pretreatment (Formula 117 for Metals) |

15-03 GENERAL: The term "paint," as used herein, includes emulsions, enamels, paints, stains, varnishes, sealers, cement-latex filler, and other coatings, whether used as prime, intermediate, or finish coats.

15-04 MATERIALS: Paints shall be in unbroken containers that plainly show at the time of use the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use. Pigmented paints shall be furnished in containers not larger than 5 gallons. Materials shall conform to the specifications shown in the painting schedule herein and to the requirements hereinafter specified.

a. Aluminum Paint shall consist of aluminum paste conforming to Federal Specification TT-P-320, type II, class B; thinner compatible with the varnish; and varnish conforming to Federal Specification TT-V-119, mixed in the proportion of 2 pounds of paste to not more than 1 pint of thinner to 1 gallon of varnish. The paste, thinner, and vehicle shall be field-mixed.

b. Enamel Paint shall conform to the following Federal Specifications: Undercoat, TT-E-543; gloss paint, TT-E-506; semigloss paint, TT-E-508.

c. Exterior oil paint shall conform to the following Federal Specifications: White, TT-P-102, class A; light tints, TT-P-102, class B; yellow, TT-P-53; green, TT-P-71; other medium colors, TT-P-81; red or brown, TT-P-31; international orange, TT-P-59; black, TT-P-61.

d. Latex Paint shall be "Magnatek" acrylic emulsion paint, exterior quality.

e. Fungicides: Both the specified first-coat material and finish paint shall contain a fungicide. The fungicidal agent shall be of a type that will not adversely affect the color, texture, or durability of the paint or size. One percent of one of the phenol mercuric compounds or 4 percent tetrachlorophenol will be acceptable. Four percent sodium tetrachlorophenate is acceptable for water-emulsion paints and glue size. Percentages are based on nonvolatile content of the paint.

f. Varnish shall be water-resisting spar varnish conforming to Federal Specification TT-V-121.

g. Wood filler paste: Federal Specification TT-F-336.

15-05 SAMPLES AND TESTING: All paint proposed for use shall be stored on the project site in sealed and labeled containers sufficiently in advance of need to allow 30 days for testing. Upon notification by the Contractor that the material is at the site, a 1-quart sample of each batch shall be obtained by random selection from the sealed containers by the Contractor in the presence of a representative of the Contracting Officer. Testing of the samples will be done by the Government in accordance with the requirements of the applicable specification. Samples will be clearly indentified by designated name, specification number, batch number, project contract number, intended use, and quantity involved. The cost of the first test will be borne by the Government. If the sample fails to meet specification requirements, the material represented by the sample shall be replaced, and the cost of retesting will be deducted from the payments due the Contractor at the rate of $35 per sample retested.

15-06 CLEANING AND PREPARATION OF SURFACES:

a. General: Hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be painted shall be removed prior to surface preparation and painting operations or otherwise protected. Floors, air-conditioners, downspouts, and other items shall be covered with paper during the painting of the adjacent surfaces. Following completion of painting of each space, removed items shall be reinstalled. Such removal and reinstalling shall be done by workmen skilled in the trades involved. Exposed nails and other ferrous metal on surfaces to be painted with water-thinned paints shall be spot-primed with zinc dust-zinc oxide or red lead metal primer. Surfaces to be painted shall be clean before applying paints or surface treatments. Oil and grease shall be removed with clean cloths and cleaning solvents prior to mechanical cleaning, except when sandblasting is employed. Cleaning solvents shall be of low toxicity and shall have a flash point in excess of $100^{0}$ F. Cleaning and painting shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

b. Concrete, shotcrete and masonry surfaces:

(1) Old concrete, shotcrete, and masonry surfaces, previously painted, shall have all cracks, holes and crevices repaired with mortar. Crack shall be cut straight with edges undercut, cleaned and moistened before application of stiff mortar. Mortar crack repairs shall be done one month prior to the paint application. Cracks appearing after completion of mortar repairs but before paint application shall be repaired with spackling compound of commerical quality. All dust, glaze, dirt and scaled or blistered old paint shall be removed before painting, using a broom and a wire brush. All exterior surfaces shall be given a wash coat of one part full strength muriatic acid and ten parts water. Surfaces shall then be rinsed thoroughly with clean water and allowed to dry; - interior walls showing the presence of effloresence salts shall receive the same treatment. All surfaces, exterior and interior, to be painted shall also be washed with a solution composed of 5 ounces of trisodium phosphate per gallon of hot water; then rinsed thoroughly with clean water and allowed to dry.

(2) New concrete, plaster and masonry surfaces shall be treated as specified above for old concrete, shotcrete, and masonry surfaces except that in addition they shall receive a neutralizing wash coat consisting of a solution of 2 pounds of zinc sulphate crystals per gallon of water. the zinc sulphate wash coat shall be allowed to dry whereafter all alkaline deposits shall be brushed off before application of paint.

c. Wood surfaces, now varnished: Remove varnish with proper solvents. Putty, glaze or spackle out all cracks and other minor irregularities. Sand down thoroughly and prime bare wood. Small, dry, seasoned knots shall be surface scraped and thoroughly cleaned, and shall be given a thin coat of knot sealer conforming to Military Specification MIL-S-12935 before application of the priming coat. Pitch on large, open, unseasoned knots and all other beads or streaks of pitch shall be scraped off, or if still soft, shall be removed with mineral spirits or turpentine and the resinous area thinly coated with knot sealer. After priming, all holes and imperfections in finish surfaces shall be filled with putty or plastic wood-filler colored to match the finish coat, allowed to dry, and sandpapered smooth.

d. Metals, Now Painted: If more than 70% (approximately) of existing finish is sound and free of checks, cracks and other defects which would interfere with the proper functioning of the specified painting system, scrape, sand lightly and dust to remove extraneous materials. spot rusting to be removed by sanding to bright metal. Immediately spot-prime, one coat, with a rust inhibitor, extending priming beyond perimeter of sanded area. If 30% or more of the area of the existing finish is defective, strip to bare metal. Immediately prime with one coat of approved type primer.

e. Galvanized surfaces to be painted shall be solvent-cleaned and treated with vinyl-type wash coat as hereinafter specidied. Galvanized surfaces not to be painted shall be solvent-cleaned.

f. Plaster Surfaces:

(1) Plaster surfaces, new, shall be dry, clean, and free from grit, loose plaster, and surface irregularities before paint is applied. Plaster to receive latex paints shall have dried a minimum of 2 weeks. Plaster on concrete or masonry surfaces shall be treated as herinbefore specified for concrete, shotcrete and masonry surfaces.

(2) Plaster, Now Painted: Wash all glossy, greasy, and/or grimy paint surfaces with a mild alkali and rinse thoroughly. Remove all loose, blistered or otherwise defective paint, smooth and feather edges be sanding. Cut out and properly fill all plaster cracks with patching plaster, spackle or Swedish putty. Prime all bare plaster. Glaze out all unevenness in plastering so that surface will be smooth. Previously painted plaster on which existing paint is loose, peeling, shows poor adhesion, checking or is unsuitable for re-painting, to be stripped to bare plaster.

15-07 PAINT APPLICATION:

a. General: The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks and variations in color, hiding, texture, and finish. All coats shall be so applied as to produce films of uniform thickness. Special attention shall be given to insure that edges, corners, crevices, welds, and rivets receive a film thickness equivalent to adjacent painted surfaces. Respirators shall be worn by persons engaged or assisting in spray painting. Adjacent areas and installations shall be protected by the use of drop cloths or other approved precautionary measures. Metal or wood surfaces adjacent to surfaces to receive water-thinned paints shall be primed and/or touched up prior to the application of water-thinned paints.

b. Storage, mixing, and thinning: At time of application, paint shall show no signs of deterioration. Paint shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Paints of different manufacturers shall not be mixed together. Where necessary to suit conditions of surface, temperature, weather, and method of application, the packaged paint may be thinned immediately prior to application in accordance with the manufacturer's directions, but not in excess of 1 pint of suitable thinner per gallon.

(1) Aluminum paint shall be mixed just prior to use. The paste pigment shall be reduced to a slurry by the addition of not more than 1 pint of thinner for 2 pounds of paste. The slurry shall then be added to the varnish.

(2) Vinyl-type wash coat shall be mixed by adding 1 volume of acid component to 4 volumes of resin component. The acid component shall be added slowly with constant stirring to the resin component. After mixing, the wash coat shall be used within 8 hours. If additional thinning is required to maintain a wet spray, reduction shall be made with normal butyl alcohol or 99 percent isopropyl alcohol. Vinyl-type wash coat shall conform to Military Specification MIL-C-15328.

c. Atmospheric conditions: Paints other than water-thinned coatings shall be applied only to surfaces that are completely free of surface moisture as determined by sight or touch. While painting is being done, the temperature of the surfaces to be painted and of the atmosphere in contact therewith shall be maintained at or above 50°F., for water-thinned coatings and 45°F., for other coatings. During periods of inclement weather, painting may be continued by inclosing the surfaces with temporary shelters and applying artificial heat, provided the temperature requirements prescribed above are maintained.

d. Time between surface preparation and painting: Surfaces that have been cleaned, pretreated, and/or otherwise prepared for painting shall be given a coat of the specified first-coat material as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surface.

e. Method of paint application: Applications on masonry shall be by brush only. Vinyl-type wash coat used on metal surfaces may be applied by brush or spray. On other surfaces, exterior first coats shall be applied by brush, and interior firs coats shall be applied by bursh or roller; subsequent coats may be applied by brush, spray, or roller. Rollers for applying enamel shall have a short nap. Areas inaccessible to spray aainting shall be coated by brushing or other suitable means. Brushes used for the application of water-emulsion paints shall be soaked in water for a period of 2 hours prior to burshing operation.

(1) Vinyl-type wash coat shall be applied at a coverage rate of 250 to 300 square feet per gallon to give a dry-film thickness of 0.3 to a maximum of 0.5 mil. Care shall be exercised in spray application to avoid the deposition of dry particles on the surface. A wet spray shall be maintained at all times. Surfaces treated with the wash coat shall be permitted to dry for not less than 1 hour and shall be coated as soon hereafter as possible.

15-08 SURFACES TO BE PAINTED:

a. General; The surfaces listed in the painting schedule below and on the drawings shall receive the surface preparation, paints, and number of coats prescribed. Piping shall not be painted until piping has been tested and approved. Explanatory indormation for use with the painting schedule is as follows:

(1) Surfaces of fabricated and assembled items that are finish-painted by the manufacturer, or specified to be finish-painted under other sections of the specification, are exempted from the following schedule requirements for surface preparation and painting. Shop-primed items shall receive surface preparation and finish painting as required by this section.

(2) Colors and tints, shall be approved by the Contracting Officer. Colors and tints shall conform to Federal Standard Number 595. All preceding coats shall match approximately the color of the finish coat.

(3) Method of surface preparation: Cleaning and pretreatment of surfaces prior to painting shall be accomplished in accordance with the detailed requirements hereinbefore described.

b. Painting Schedule: (see next page)

b. Painting Schedule:

| Surface | Surface Preparation & Pretreatment | 1st Coat | 2d Coat | 3d Coat |
|---|---|---|---|---|
| Painted exterior Concrete, shot-crete and masonry surfaces | As previously Specified | "Magnatek" | "Magnatek" | None |
| Exterior poured concrete surfaces (except floors & rubbed-finish surfaces) | As previously specified | "Magnatek" | "Magnatek" | None |
| Exterior masonry surfaces | As previously specified | "Magnatek" | "Magnatek" | None |
| Exterior ferrous surfaces subject to atmospheric exposure | As previously specified | Exterior oil paint MIL-P-12742 | Exterior oil paint MIL-P-12507 | None |
| Exterior wood surfaces | Solvent cleaning, scraping, sealing and sandpapering | TT-P-25 | Exterior oil paint | Exterior oil paint |
| Exterior galvanized surfaces | Wash with solvents, apply vinyl-type wash coat | TT-P-641, type II MIL-P-12742 | Exterior oil paint MIL-P-12507 | None |
| Exposed exterior calking compound | None | Aluminum paint | Same as adjacent area. | Same as adjacent area. |
| Interior plaster, Bath, Toilet & Kitchen | As previously specified | TT-P-29 | TT-E-543 | TT-E-508 |
| Interior plaster, generally | As previously specified | "Magnatek" | "Magnatek" | None |
| Interior painted plaster | As previously specified | "Magnatek" | "Magnatek" | None |

15-08

| Surface | Surface preparation & Pretreatment | 1st Coat | 2d Coat | 3d Coat |
|---|---|---|---|---|
| Ferrous surfaces of mechanical equipment & machinery other than machined surfaces and stainless steel. | As previously specified | TT-E-489, class A | TT-E-489, class A | None |
| Metal interior trim except stainless steel | As previously specified | TT-E-543 | TT-E-508 | TT-E-508 |
| Interior wood surfaces | As previously specified | TT-E-543 | TT-E-508 | TT-E-508 |

15-09 CLEANING: All cloths and cotton waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint spots, oil, or stains upon adjacent surfaces shall be removed and the entire job left clean and acceptable.

SECTION 16

HARDWARE: BUILDERS' (GENERAL PURPOSE)

16-01 SCOPE: This section covers builders' hardware, complete.

16-02 HARDWARE NOT INCLUDED: Hardware for aluminum windows are specified in Section: ALUMINUM WINDOWS and ASSOCIATED WORK. Fittings and hardware for toilet partitions, except door hardware, are specified in section BATHROOM & TOILET ACCESSORIES.

16-03 APPLICABLE PUBLICATIONS. The following Federal Specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

| | |
|---|---|
| FF-H-106a (1) & Int. Am-9 | Hardware, Builders'; Locks and Door Trim. |
| FF-H-00111b (GSA-FSS) | Hardware, Builders'; Shelf and Miscellaneous. |
| FF-H-116c (4) | Hinges, Hardware, Builders'. |
| FF-H-121c. | Hardware, Builders', Door-Closing Devices. |
| FF-H-136 (1) | Hardware & Fittings; (for) Lavatory Partitions & Inclosures. |
| QQ-S-766c (2) | Steel Plates, Sheets, and Strip-Corrosion Resisting. |

16-04 GENERAL: Unless otherwise specified, hardware shall conform to the applicable requirements of the Federal Specifications listed herein. All modifications to hardware, required by reason of construction characteristics, shall be such as to provide the specified operative or functional features. Hardware for application on metal shall be made to standard templates.

16-05 MATERIALS: Unless otherwise specified herein, all hardware shall be brass or bronze. The following items of hardware may be supplied in corrosion-resisting steel in lieu of the brass or bronze specified.

| | |
|---|---|
| | Hooks, coat |
| | Knobs, door |
| Escutcheons, knob | Knobs, turn |
| Floor hinges (except floor plate) | Plates, push |

| | |
|---|---|
| Pulls, cup, flush | Roses |
| Pulls, door, sectional | Stops, door |
| Pulls, drawer | |
| Pull-on plate, door | |

a. Corrosion-resisting steel shall conform to Federal Specification QQ-S-766, class 302.

16-06 SAMPLES SCHEDULE AND SAMPLES: AS soon as practicable after award of contract and before a hardware schedule is prepared or any hardware delivered to the project site, the contractor shall submit to the Contracting Officer for approval a samples list in quintuplicate, listing each of the different items of builders' hardware required. The samples list shall be submitted in the following form:

| Item No. & file desig'n | Specification reference, type, or catalog No. | Name of item | Mfrs. name and catalog No. of item supplied |
|---|---|---|---|
| 1 (F) | 161 B | Lock | ABC Lock Company -L10 |
| 2 (NF) | T2102 NRP | Butt hinge | XYZ Hinge Company-L20 |

Item 1 (F) indicates the sample is on file at Federal Supply Service, 7th and D Streets, S. W., Washington, D. C. Item 2 (NF) indicates the sample is not on file and may be required. Opposite each listed item number the following shall be inserted: the symbol (F) or (NF), as appropriate, the specification reference, type, or catalog number; the name of the item; and the manufacturer's name and catalog number of the item supplied. In addition to the samples list, a sample of each different item of builders' hardware, or catalog properly tagged or marked for identification, shall be submitted to the Contracting Officer for approval. Following approval of the samples list and the samples by the Contracting Officer, a permanent schedule of hardware showing the quantities, types, and locations of the various items of hardware required for the project shall be delivered in triplicate to the Contracting Officer for record. The permanent schedule shall include only the catalog number of the items appearing on the approved samples list.

16-07 HARDWARE TYPES:

a. Armor or Kick plates shall be type 1225, satin, unless otherwise specified. Width shall be 1-3/4 inches less than the door width on the push side of the door, and ½ inch less than the door width on the pull side of the door. Kick plates shall be 10 inches high, unless the bottom rail of the door is less than 10 inches, in which case kick plates shall extend to within 1 inch of the panel or glass bead.

b. Butt hinges for interior doors shall be the following types:

(1) For interior doors with door closer: Type 2102.

(2) For interior doors without closer: Type 2122.

(3) For doors equipped with overhead door closer: Extra-heavy types, as required.

(4) Interior doors with reverse bevel and specified to be locked shall have butts with nonremovable pin when the door is in the closed position.

(5) Butt hinge widths: Where the projection of the door trim is such as to prevent clearance with the butt hinges specified, hinges with leaves of sufficient width to clear the trim shall be provided.

(6) Butt hinges per door:

| Height of door (inches) | Butts required |
|---|---|
| 60 or less | 2 |
| Over 60 and not over 90 | 3 |

(7) Butt hinge sizes: (unless otherwise specified):

| Door thickness (inches) | Door width | Butt size (inches) |
|---|---|---|
| 7/8 or 1 | Any | 2-1/2 |
| 1-1/8 | Any | 3 x 3 |
| 1-3/8 | Any | 3-1/2 x 3-1/2 |
| 1-3/4 | 3 feet and less | 4-1/2 x 4-1/2 |
| 1-3/4 | Over 3 feet | 5 x 5 |

c. Spring hinges for lavatory doors shall be "Hommer" type 1042, or equal.

d. Door-closing devices:

(1) Concealed-type closers shall be type 3220, (LCN 303-H90 or equal).

(2) Floor pivot spring hinges shall be type 2334. Floor plates for floor hinges shall be brass, bronze, or corrosion-resisting steel, as applicable.

(3) Door-closer products of only one manufacturer of each of the respective door-closing devices will be acceptable for the project.

e. Door stops shall be the types specified in the hardware schedule. Equals are acceptable. Stops shall be supplied wherever an item of door hardware or a door, when opened, might contact a wall or other part of the building construction.

f. Locks, lock sets, and latch sets:

(1) Manufacture: The locks, lock sets, and latch sets furnished shall be those of a single manufacturer. Locks shall be the types specified in the hardware schedule.

(2) Knobs and roses for series 161 shall be the cold-forged, or heavy wrought type. Metal may be solid, laminated, or reinforced. The minimum thickness of knob shells and/or roses shall be 0.050 inch. Laminated or reinforced-type knobs and roses shall have a minimum outer-shell thickness of 0.035 inch. Roses shall be of the concealed-screw type.

(a) Lock trim for bored-type locks and latches shall be type 4, except as herein specified.

(3) Backset shall be 2-3/4 inches, unless otherwise specified.

(4) Fronts for single-acting doors 1-3/4 inches thick shall have the standard bevel. Armored fronts shall be provided for mortise-type cylinder locks.

(5) Pins: Cylinder locks shall have five pins, unless six-pin tumblers are required for the master-key system.

(6) Marking: The key change number and the manufacturer's name or trademark shall be stamped or engraved on the cylinder or cam of each lock.

g. Metal thresholds shall be of bronze of the types hereinafter specified and/or shown on the drawings.

h. Push and pull plates shall be type 456

16-08 FINISHES:

a. Hardware shall have the following U.S. Standard finishes:

US26 --- Exposed surfaces of brass or bronze when used in toilets, baths, and Kitchens.

US26D --- Exposed surfaces of brass or bronze elsewhere.

[redacted] --- Exposed surfaces of aluminum.

[redacted] --- Exposed surfaces of corrosion-resisting steel.

16-09 KEYS AND KEYING:

a. Keys shall be supplied as follows:

Cylinder locks .....2 Keys each

Master-Keyed sets .....6 Keys each

b. Keying: Locks shall be keyed and master-keyed as directed. Keys shall be stamped with the change number. After all locks have been installed, the respective keys shall be shown to operatethe locks in the presence of the Contracting Officer. The keys shall be properly tagged and delivered to the Contracting Officer.

c. Before any hardware is delivered, a keying system shall be prepared and submitted to the Contracting Officer for approval.

16-10 APPLICATION OF HARDWARE: Hardware shall be applied with fastenings of proper size, quantity, and finish. Machine screws and lead expansion shields shall be used for hardware attachment to concrete, stone, tile, and masonry.

a. Armorplates shall be installed on the push side of single-acting doors and both sides of double-acting doors.

b. Butt hinges:

(1) Top hinges shall be installed with the top of hinge 5 inches below the rabbet of the head jamb.

(2) Bottom hinges shall be installed with the bottom of hinge 10 inches above the finish floor.

(3) Intermediate hinges shall be equidistant between the top and bottom hinges or pivots.

c. Spring hinges: shall be installed according to the manufacturers instructions.

d. Door-closing devices shall be installed in strict accordance with the templates and printed instructions supplied by the manufacturer of the devices.

e. Flush gun pulls for sliding counter doors shall be installed with the bottom of plate in the (vertical) center of door.

f. Kick plates shall be installed as armorplates..

g. Lock and latch strikes:

(1) The location of strikes for knob locks and knob latches shall be determined by installing the center of the door knob 38 inches above the finish floor.

(2) The location of strikes for deadlocks shall be determined by installing the lock cylinder 52 inches above the finish floor.

h. Push plates shall be installed so that the center of the plate will be 48 inches above the finish floor.

i. Other hardware shall be installed according to the manufacturers recommendations, according to standard practice, or as directed.

16-11 HARDWARE SETS: Following are the required hardware sets:

a. Door hardware

| Door No. | Hardware | Type No. | Quantity Per Door |
|---|---|---|---|
| D-1 | Butt Hinges | 2162 | 3 |
| | Lock Set | 160 L | 1 |
| | Kick Plate | 1225 | 1 |
| | Door Stop | 1329 E | 1 |
| | Threshold | as indicated | |
| D-2 | Butt Hinges | 2102 | 3 |
| | Lock Set | 161 L | 1 |
| | Door Closer | LCN 303-H90 | 1 |
| | Kick Plate | 1225 | 1 |
| | Threshold | as indicated | |
| D-3 | Spring Hinge | 2334 | 1 |
| | Kick Plate | 1225 | 2 |
| | Push and Pull Plate | 456 | 2 |
| D-4 | Butt Hinges | 2102 | 3 |
| | Lock Set | 161 T | 1 |
| | Door Stop | 1330 | 1 |
| D-5 (Toilet Door, Ladies' Toil.) | Spring Hinge | Bommer 3000, 5" | 2 |
| | Bolt & Keeper | Bommer 5007 | 1 |
| | Strike | Bommer 1072 | 2 |
| | Hook & Bumper | 4330 | 1 |

| | | | |
|---|---|---|---|
| Toilet Stall Doors (men's toilet) | Spring Hinge | Bommer 1042 | 1 |
| | Latch | 4302 | 1 |
| | Strike | 4302 A | 1 |
| | Hook & Bumper | 4330 | 1 |
| Other Door Hardware (for exist, Doors to rooms 101 & 102) | Door Stops | 1330 | 1 |

b. Cabinet hardware:

| Item | Hardware | Type No. | Quantity Per Item |
|---|---|---|---|
| Swinging Doors | Cabinet hinges | 2277 | as required |
| | Pull | KV-822 | 1 Ea |
| | Friction catch | F 1073 B | 2 Ea |
| Sliding Doors | Track | KV-465 | set |
| | Sheaves | KV-413 | 2 Ea |
| | Pull | KV-807 | 1 Ea |
| Closet Drawers | Extension Drawer slide | F 1315 | 2 Ea |
| Kitchen Drawers | Extension Drawer slide | F 1315 | 2 Ea |
| | Pull | KV-822 | 1 Ea |

SECTION 17

PLUMBING, GENERAL-PURPOSE

17-01 SCOPE: This section covers the plumbing system, complete.

17-02 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

| | |
|---|---|
| O-C-114a | Calcium Hypochlorite, Technical and Chlorinated Lime, Technical. |
| CS-M-636c | Motor, Alternating Current (Fractional Horsepower). |
| HH-C-536a | Compound; Plumbing-Fixture-Setting. |
| HH-G-116 | Gaskets; Plumbing-Fixture-Setting. |
| HH-I-552 | Insulation Pipe Covering, Thermal, and Insulation Blanket, Thermal, Pipe Covering. |
| HH-I-562 & Int. Am. 2 | Insulation, Thermal, Mineral Wool, Block or Board and Pipe Insulation (Molded Type). |
| HH-P-117 | Packing; Jute, Twisted. |
| QQ-c-40 | Calking: Lead Wool & Lead Pig. |
| QQ-L-201e (ships) | Lead Sheet. |
| WW-H-171c (1) | Hangers and Supports, Pipe. |
| WW-N-351a (1) | Nipples, Pipe, Threaded. |
| WW-P-401c | Pipe and Pipe-Fittings; Cast-Iron, Soil. |
| WW-P-406b (1) | Pipe, Steel (Seamless and Welded) (for Ordinary Use). |
| WW-P-441c (1) | Pipe; Wrought Iron, (Welded, Black or Zinc Coated). |
| WW-P-491a (1) | Pipe-Fittings; Cast-Iron, Drainage. |
| WW-P-501c (1) | Pipe-Fittings, Cast Iron, Screwed, 125- and 250-Pound. |
| WW-P-521e | Pipe-Fittings, Flange Fittings & Flanges, Ferrous & Steel, (Screwed & Butt-Welded) 150-Pound. |
| WW-P-541b (2) & Int. Am. 6 | Plumbing-Fixtures, Land Use. |
| WW-U-00531b (GSA-FSS) | Union, Pipe (Steel or Malleable Iron, Threaded Pipe Connection). |
| WW-V-0051b (GSA-FSS) | Valves, Bronze; Angle, Check and Globe, 125- and 150-Pound, Screwed and Flanged (for Land Use). |

WW-V-54b Valve, Gate; Bronze, 125- and 150-Pound, Screwed and Flanged (for Land Use).

GGG-P-351a Pipe-Threads; Taper (American National).

b. American Society of Mechanical Engineers Publication:

Boiler and Pressure Vessel Code.

c. American Standards Association Standard:

B19-1938 Safety Code for Compressed Air Machinery and Equipment.

17-03 GENERAL: The general arrangement of the plumbing shall be as indicated on the drawings. Detailed drawings of the proposed departures due to actual field conditions or other causes shall be submitted to the Contracting Officer for approval. Equipment, materials, and fixtures required for use in conjunction with the items to be furnished by the Government, as listed in the Special Conditions, shall be furnished and installed by the contractor. The contractor shall carefully examine the drawings and shall be responsible for the proper fitting of materials and equipment in each building as indicated, without substantial alteration.

a. Utilities: Water and drainage piping shall be extended to points indicated on the drawing where the pipes shall be connected. If trenches are closed or the pipes are otherwise covered before being connected the location of the end of each plumbing utility shall be marked with a stake or other acceptable means.

b. Cross connections and interconnections: No plumbing fixture, device, or piping shall be installed that will provide a cross connection or interconnection between a distributing supply for drinking or domestic purposes and a polluted supply such as a drainage system or a soil or waste pipe in such manner as to make possible the backflow of sewage, polluted water, or waste into the water-supply system. Where it is necessary to cross a sewer or waste line with a water line, the water line shall be above the sewer line with a 1 foot minimum clearance between lines and the sewer shall be cast iron soil pipe for a minimum of 10 feet each side of the crossing.

c. Specifications: Required materials not covered by the detailed specifications shall meet the requirements of the applicable specifications listed hereinbefore, and shall be of the required class, grade, and type. Shop tests of pipe, valves, and fittings, required by Federal Specification to be conducted in the presence of a Government inspector, are waived.

d. Connections to equipment and fixtures furnished by the Government or specified elsewhere: The contractor shall provide all necessary material and labor to connect to the plumbing system all fixtures and equipment having plumbing connections, and which are furnished by the

Government or are specified in other sections of these specifications. Drainage connections shall be trapped. The service line to each item of equipment shall be equipped with a cut off valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures.

e. Drawings: Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The contractor shall carefully investigate the structural and finish conditions affecting all his work and shall arrange such work accordingly, furnishing such fittings, traps, valves, and accessories as may be required to meet such conditions, at no additional cost to the Government.

f. Cutting and repairing: The work shall be carefully laid out in advance, and any excess cutting of construction will not be permitted. Damage to buildings, piping, wiring, or equipment as a result of cutting for installation shall be repaired by mechanics skilled in the trade involved, at no additional expense to the Government.

g. Protection to fixtures, materials, and equipment: Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury. Upon completion of all work, the fixtures, materials, and equipment shall be thoroughly cleaned, adjusted, and operated. Belts, pulleys, chains, gears, couplings, projecting set screws, keys, and other rotating parts located so that any person may come in close proximity thereto shall be fully enclosed or properly guarded.

h. Standard products: The equipment to be furnished under this specification shall be essentially the standard product of the manufacturer. Where two or more units of the same class of equipment are required, these units shall be products of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer, but the contractor shall assume full responsibility for the satisfactory operation of all component parts to assure compatibility of such equipment and performance of the integrated system in accordance with requirements of the specification.

17-04 APPROVAL OF MATERIALS, FIXTURES, AND EQUIPMENT: As soon as practicable and within 30 days after receipt of notice to proceed and before any material, fixtures, or equipment are purchased, the contractor shall submit for approval by the Contracting Officer, a complete schedule in triplicate, of materials, fixtures, and equipment to be incorporated in the work, together with the names and addresses of the manufacturers and their catalog item numbers and trade names. No consideration will be given to partial lists submitted from time to time. Approval of the

materials will be based on manufacturers' published ratings. Approval of materials, fixtures, and equipment under this provision shall not be construed as authorizing any deviations from the specifications, unless the attention of the Contracting Officer has been directed to the specific deviations. Equipment differing from that specified may be proposed, provided the contractor clearly states such differences and provided all essential requirements of the specification are met. If the equipment offered under this provision is, in the opinion of the Contracting Officer, equal to or better than that specified, it will be given consideration.

a. Samples and testing: Samples of sufficient quantity or suitable size of all materials proposed for use shall be submitted in advance of need to allow not less than 30 days for testing. A written certificate together with test report from an approved, nationally recognized testing agency, adequately equipped and competent to perform such services, shall be submitted with the samples to prove that the materials have been tested and conform to the requirements of the specifications. The samples, certificates and reports shall be supplied by and at the expense of the contractor. Submission of certified test report shall not constitute final approval of materials by the Contracting Officer. At the option of the Contracting Officer, the samples may be retested by the Government without cost to the contractor; provided, however, that the cost of any test performed by the Government that results in nonconformance with the specification requirements shall be deducted from payments due the contractor at the rate of $45 per samples.

b. Spare parts: As soon as practicable after approval of list of equipment, and if possible not later than 4 months prior to the date of beneficial occupancy, the contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies, with the current unit prices and source of supplies; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of equipment or specified herein to be furnished as part of the contract; and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 120 days at the particular installation. The foregoing shall not relieve the contractor of any responsibilities under the guaranty hereinafter specified.

17-05 MATERIALS AND EQUIPMENT: Plumbing fixtures, valves, air compressors, and items with one or more working parts shall be the products of U.S.S. manufacturers. Items, static in nature, such as pipe, fittings and insulation may be of other manufacturer provided the requirements of the specification are met. The following materials and equipment shall conform to the respective specifications and other requirement specified below:

a. Calking lead: Federal Specification QQ-L-156, type I.

b. Fittings:

(1) Cast-iron soil pipe and fittings: Federal Specification WW-P-401.

(2) Cast-iron threaded fittings: Federal Specification WW-P-501, class A or B.

(3) Drainage fittings: Federal Specification WW-P-491.

(4) Malleable-iron fittings: Federal Specification WW-P-521, type II.

(5) Unions: Federal Specification WW-U-516 or WW-U-531, as applicable.

c. Pipe and tubing:

(1) Cast-iron soil pipe: Federal Specification WW-P-401.

(2) Steel pipe: Federal specification WW-P-406, weight A, class 2.

(3) Wrought-iron pipe: Federal Specification WW-P-441, class A, zinc-coated.

d. Plumbing fixtures and drains: Federal Specification WW-P-541.

e. Plumbing-fixture-setting compound: Federal Specification HH-C-536.

f. Plumbing-fixture-setting gaskets: Federal Specification HH-G-116, type best suited for the work.

g. Sheet lead: Federal Specification QQ-L-20.

h. Twisted-jute packing: Federal Specification HH-P-117, Type II, tarred, for calking cast-iron soil, pipe when joints are sealed with lead.

i. Valves:

(1) Angle, check, and globe valves: Federal Specification WW-V-51, class A or B; type as suitable for the application. Soldered-joint-type valves shall be designated for a water working pressure of 150 pounds per square inch.

(2) Gate valves: Federal Specification WW-V-54, type I, II, or III, class A or B, as applicable.

17-06 SOIL, WASTE, DRAIN, AND VENT PIPING: Underground soil, waste, and drain pipe and fittings shall be coated bell-and-spigot cast-iron. Soil, waste, drain, and vent pipe, above ground shall be galvanized steel, galvanized wrought-iron, or bell-and-spigot cast-iron pipe. Fittings for piping above ground shall be drainage pattern for all threaded drain and waste piping, and cast-iron soil fittings for bell-and-spigot pipe. Fittings on all dry vents shall be malleable-iron or cast-iron.

a. Installation:

(1) Drainage pipes and vent piping: Horizontal soil and waste pipes shall be given a grade of 1/4 inch per foot where possible, but in no case less than 1/8 inch per foot. All main vertical soil and waste stacks shall be extended full size to the roof line and above as vents, except where otherwise specifically indicated. Where practicable, two or more vent pipes shall be connected and extended as one pipe through the roof. Vent pipes in roof spaces shall be run as close as possibele to underside of the roof without forming traps in pipes, using fittings as required. Vertical vent pipes may be connceted into one main vent riser above vented fixtures. Where a circuit vent pipe from any fixture or line of fixtures is connected to a vent line serving other fixtures, the connection shall be at least 4 feet above the floor on which the fixtures are located, to prevent the use of any vent line as a waste. Horizontal waste lines receiving the discharge from two or more fixtures shall be provided with end vents, unless separate venting of fixture is noted. The cast-iron bell-and-spigot pipe inside of buildings shall be extended 6 inches above the floor.

(2) Fittings: Changes in pipe size on soil, waste, and drain lines shall be made with reducing fittings or recessed reducers. All changes in direction shall be made by the appropriate use of 45-degree wyes, long or short-sweep 1/4 bends, 1/6, 1/8 or 1/16 bends, or by a combination of those or equivalent fittings. Single and double sanitary tees and quarter bends may be used in drainage lines only where the direction of flow is from horizontal to vertical. Short sweeps not less than 3 inches in diameter may be used where the change in derection of flow is either from horizontal to vertical or from vertical to horizontl .

(3( Union connections: Slip joints will be permitted only in trap seals or on the inlet side of the traps. Tucker or hub drainage fittings shall be used for making union connections wherever practicable. The use of long screws and bushings is prohibited.

b. Joints:

(1) Cast-iron pipe: Joints in bell-and-spigot cast-iron soil, waste, and vent pipes, or between cast-iron soil, waste, and vent pipes and threaded pipe or caulking ferrules, shall be firmly packed with oakum or hemp and caulked with lead at least 1 inch deep.

(2) Threaded pipe: Threaded joints shall have American National taper-screw threads conforming to Federal Specification GGG-P-351, with graphite and oil compound applied to the male thread. Connections between threaded pipe and soil pipe shall be similar, and the threaded pipe shall hve a ring or half coupling screwed on to form a spigot end.

17-07 CLEANOUT PLUGS AND TEST TEES: Cleanouts shall be the same size as the pipe except that cleanout plugs larger than 4 inches will not be required. Cleanouts installed in connection with cast-iron hub-and-spigot pipe shall consist of a leg-sweep 1/4 bend or one or two 1/8 bends extended to an easily accessible place, or where indicated on the drawings. An extra-heavy cast-brass ferrule with countersunk trap screw cover shall be caulked into the hub of the fitting and shall be flush with the floor. Where cleanouts in connection with threaded pipe are indicated and are accessible, they shall be cast-iron drainage T-pattern 90-degree branch fittings with extra-heavy brass screw plugs of the same size as the pipe up to and including 4 inches. Test tees with cast-iron cleanout plugs shall be installed at the foot of all soil, waste, and drain stacks and on each building drain outside the building.

17-08 FLASHING FOR COATED ROOFS: Vent pipes on coated roofs shall be flashed and made watertight at the roof by means of sheet lead and glass fiber fabric. Vents passing through roofs shall be provided with galvanized wrought iron or steel pipe sleeve with anchor as shown on the drawings. Sleeve shall be of size to allow proper caulking. The lower part of the space between the sleeve and vent pipe shall be caulked with oakum and the upper part of the space sealed with bituminous compound not less than one inche in depth. For wrought-iron or steel vent, the lead flashing shall be extended a minimum of six inches up the vent pipe, and for cast iron vent, the lead flashing shall be extended to the top and turned down into the pipe. Each flashing shall extend not less than eight inches from the vent pipe on the roof. For steel or wrought iron vents, a galvanized malleable-iron recess roof coupling shall be provided to form counter flashing over the lead flashing. Top of vents shall be not less than 12 inches above the roof. Over the lead flashing a glass fiber fabric shall be thoroughly cemented to the lead flashing and roof as indicated on the drawings.. Fabric shall extend not less than 12 inches from the vent on the roof and shall be evenly bedded in bituminous plastic cement applied with a trowel using not less than 1/2 pound per square foot.

17-09 TRAPS: Each fixture and piece of equipment requiring connections to the drainage system shall be equipped with a trap. Traps are specified to be supplied with the fixtures. Each trap shall be placed as near to the fixture as possible, and no fixture shall be double-trapped. Traps installed on bell-and-spigot pipe shall be cast-iron. Traps installed on threaded pipe shall be recess drainage pattern.

17-10 DRAINS: Floor and shower drains shall conform to Federal Specification WW-P-541, type 216, and shall be made of high-grade, strong, tough, and even-grained metals. Castings shall be free from blowholes, porosity, hard spots, excessive shrinkage, cracks, or other injurious defects, shall be smooth and well cleaned both inside and outside, and shall have all fins and roughness removed. Castings shall not be repaired, plugged, brazed, or burned-in. The wall thickness of iron castings shall be not less than 1/4 inch. Chromium plating shall conform to Federal Specification WW-P-541.

17-11 WATER PIPE, FITTINGS, AND CONNECTIONS:

a. Installation: A gate valve and drain on the service line shall be installed outside the building. The piping shall be extended to all fixtures, outlets, and equipment from the gate valve. The cold-water system shall be installed with a fall toward the shutoff valve. Plugged or capped fittings shall be provided for draining low points of the piping system except where valved outlets are shown on drawings. Outlets shall be capped or plugged as indicated on the drawings, and left ready for future connections. Bends formed with hydraulic-operated pipe benders are acceptable.

(1) Mains, branches, and runouts: Piping shall be installed as indicated on the drawings. Pipe shall be cut accurately to measurements established at the building by the contractor and shall be worked into place without springing or forcing. Care shall be taken not to weaken the structural portions of the building. Piping above ground shall be run parallel with the lines of the building unless otherwise shown or noted on the drawings. Branch pipe from service lines may be taken off top of main, bottom of main, or side of main using such crossover fittings as may be required by structural or installation conditions. Service pipe, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering and other work and not less than 1/2 inch between finished covering on the different services. No water piping shall be buried in floors unless specifically indicated on drawings or approved. Changes in pipe sizes shall be made with reducing fittings. The use of long screws and bushings will not be permitted.

(2) Pipe drains shall be installed at low points on the piping and shall consist of 1/2-inch globe valves with renewable disks and 3/4-inch hose nipples. All piping shall grade down to the drains.

(3) Expansion and contraction of piping: Allowance shall be made throughout for expansion and contraction. Horizontal runs over 50 feet in length shall be anchored to the wall or to the supporting construction about midway on the run to force expansion, evenly divided toward the ends.

(4) Shock absorbers shall be the standard product of a reputable manufacturer with metal bellows or neoprene cells to absorb shock, and shall be installed in accordance with the manufacturer's recommendations.

(5) Air chamber shall be provided on all hot and cold supplies near each faucet, control valve, or flush valve, except wall hydrant and hose bibbs. If not definitely shown on drawings, air chambers shall consist of a 12 inch length of pipe of same diameter as the branch supply capped.

b. Joints:

(1) Threaded pipe: After cutting and before threading, pipe shall be reamed and shall hve burs removed. Screw joints shall be made with graphite or inert filler and oil or with an approved graphite compound applied to male threads only. Caulking of threaded joints to stop or prevent leaks will not be permitted. Unions shall be provided where required for disconnection of exposed piping. Unions will be permitted where access is provided. Threaded swing joints shall be used for branch connections to risers and mains.

c. Sterilization: The entire water-distribution system shall be thoroughly sterlized with a solution containing not less than 50 parts per million of available chlorine. The chlorinating material shall be either liquied chlorine conforming to Federal Specification BB-C-120 or calcium hypochlorite or chlorinated lime conforming to Federal Specification O-C-114, and shall be introduced into the system in an approved manner. The sterilizing solution shall be allowed to remain in the system for a period of 8 hours, during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until the residual chlorine content is not greater than 0.4 part per million, unless otherwise directed.

17-12 VALVES shall be provided on all supplies to fixtures as specified under TYPES OF FIXTURES AND FIXTURE TRIMMINGS. Valves indicated in connection with runouts, risers, branches, and mains shall be in accordance with this specification. No valve shall be installed on any line with its stem below the horizontal. All valves shall be gate valves unless otherwise specified or indicated. Valves shall be all brass with threaded ends for ferrous pipe and shall have wrought bodies.

17-13 UNIONS on ferrous pipe 2 inches in diameter and smaller shall be malleable iron in accordance with Federal Specification WW-U-531, type B, zinc-coated. Unions on water piping 2-1/2 inches in diameter and larger shall be flange pattern conforming to Federal Specification WW-P-406, and shall be zinc-coated cast-iron. Gaskets for flanged unions shall be of the best quality fiber, plastic or leather. Unions shall not be concealed in walls, ceilings, or partitions.

17-14 ELECTRIC WATER HEATER shall conform to Federal Specification W-H-196.

17-15 RELIEF VALVES: Temperature and pressure relief valves shall conform to Military Specification MIL-V-13612. Type I, Flaves shall be installed when the heat input is less than 100,000 BTU/HR, and when the storage is less than 120 gallons. If either or both of the specified conditions are reached or exceed, type II and type III valve shall be installed. Vacuum relief valve shall be installed on each cold water branch connection to electric water heaters at an elevation above the top of the heater. The vacuum relief shall be designed to prevent damage to the water heaters in the event of vacuum conditions caused by a reverse flow of water from within the equipment.

17-16 INSULATION: After tests have been completed and surfaces cleaned, insulation shall be installed on all aboveground water piping except piping used exclusively for fire protection. Insulation shall be installed on piping in furred spaces, vent shafts, wall chases and crawl spaces. Insulation shall not be installed on chromium-plated piping.

a. Insulation on pipes, valves, and fittings: Concealed-pipe insulation shall be held in place with metal bands not less than 3/4 inch wide. Bands shall be of not less than 0.005-inch nickel-copper alloy, 0.007-inch aluminum, or 0.01-inch brass. The bands shall be spaced not more than 18 inches apart, one binding the adjacent ends and one at the center of each full section. Three bands shall be used at each tee and two at each elbow. The end of the insulation shall be fitted with a metal protector supported by a ceiling plate secured by means of a setscrew. Insulation shall be continuous and shall extend full thickness and finish painting shall conform to the PAINTING, GENERAL section.

(1) Vapor-barrier jackets shall be installed over all insulation including valves and fittings. The jackets shall consist of flame-retardant paper and aluminum foil laminated. Longitudinal joints shall lap not less than 1-1/2 inches, and end of joints shall have a 4-inch sealing strip. All joints shall be sealed with a flame-retardant adhesive. Moisture seals shall be provided to prevent water from condensing as a result of open areas. Insulation on flanges, valves, and fittings shall be vapor sealed with aluminum foil wrapped or crinkled in place. The foil shall be vapor sealed with flame-retardant adhesive troweled neatly, and the jacket on the adjacent pipe shall be lapped over the mastic. The ends of insulation including breaks at hangers shall be moisture sealed with flame-retardant mastic.

(2) All pipe insulation shall conform to Federal Specification HH-I-548, type II, class 1, or Federal Specification HH-I-552, type I, class A, except that the jackets shall be fire-retardant vapor barrier.

(3) Insulation on valves and Fittings: All valves and fittings shall be insulated with premolded, prefabricated, or job-fabricated segments of pipe insulation of the same material as and of equal thickness to the adjoining pipe insulation.

17-17 PIPE SLEEVES AND HANGERS shall be furnished and set, and the contractor shall be responsible for their proper and permanent location. Pipe will not be permitted to apss through footings, beams, or ribs unless noted on the drawings.

a. Pipe sleeves shall be of cast iron, wrought iron, steel, or fiber, properly secured in place, with approximately 1/4-inch space between pipe and enclosing sleeve. Pipe sleeves shall be provided for all pipe passing through walls and floors below finished grade. Sleeves of No. 26 U.S.S. gage galvanized iron, of fiber with wall thickness not less than 1/4 inch, or of other suitable approved material shall be installed with approximately 1/4-inch space all around for all pipes passing through partitions. The sleeves shall be of sufficient size to permit installation of the covering with the usual clearance. Sleeves and chases for piping, inserts for hangers, and similar installations shall be provided in all construction as specified herein. Cutting of construction shall be done only with the permission of the Contracting Officer, and construction shall be repaired to match its original condition by mechanics of the trade which originally executed the work. Under this section the contractor shall do no cutting of woodwork, cement work, concrete work, or other materials in the building. Locations and sizes of chases and openings necessary for the proper installation of the work shall be determined in advance and provided during the erection of the work. Sleeves of wrought-iron or steel pipe shall be provided where pipes pass through concrete beams or concrete fireproofing. Sleeves passing through floors shall extend not less than 1 inch and not more than 2 inches above finished floors. Where pipes pass through waterproofing membranes, flashing sleeves shall be installed. The sleeves shall be provided with an intergral flashing flange or a clamping device to which a flashing shield can be clamped or soldered. The shield shall be of not lighter than 4-pound sheet lead, shall extend not less than 8 inches from the pipe, and shall be thoroughly mopped into the membrane. The space between the sleeve and the pipe shall be made watertight by inserting a picked-oakum gasket and filling the remaining space with pig lead and thoroughly calking.

b. Pipe hangers, inserts, and supports: Hangers shall conform to Federal Specification WW-H-171. Inserts shall be types 18 and 19 and shall be installed before the concrete is poured. Hangers and supports shall be installed at dimensions not to exceed the maximum limits, and at intervals to keep the pipe in alienment and to carry the weight of the pipe and contents.

(1) Horizontal piping: Hangers and supports shall be installed as specified hereinafter, and at locations not more than 3 feet from the end or each runout. A hanger shall be installed not over 1 foot from each change in direction of piping. Hangers and turnbuckles shall be types 1,9,11, 12 and 13. Brackets for support of piping at walls shall vonform to type 35. In lieu of separate hangers, the contractor may submit for approval by the Contracting Officer a detail drawing of trapeze hangers with turnbuckles on rods and solid or split-ring clamp for each pipe which he proposes to furnish.

(a) Cast-iron soil pipe shall be supported at not more than 5-foot intervals, and support shall be located near each hub.

(b) Threaded pipe shall be supported at 10-foot intervals.

(c) Piping in earth shall be laid on a firm bed for its entire length, except where support is otherwise provided.

(2) Vertical piping: Supports shall be spaced as specified herinafter, and at locations not more than 8 feet from end of riser. Pipe clamps shall be type 32.

(a) Cast-iron and threaded pipe shall be supported at each floor and at intervals of not more than 20 feet.

c. Fixture and equipment supports and fastenings: Fixtures and equipment shall be supported and fastened in a satisfactory manner.

Where secured to concrete block walls or partitions, fixtures and equipment shall be fastened with 1/4-inch brass toggle or through-bolts. Through-bolts shall be provided with plates or washers at back, set so that heads, nuts, and washers will be concealed by plaster. Exposed heads of bolts and nuts shall be hexagonal with rounded tops finished and chrominum-plated, with chrominum-plated hexagonal nuts to conceal end of bolts where exposed. Exposed nuts and heads of screws shall be provided with chromium-plated brass washers.

17-18 FLOOR, WALL, AND CEILING PLATES: Uncovered exposed pipes, where passing through floors, finished walls, or finished ceilings, shall be fitted with chromium-plated or enameled cast-iron or steel plates. Plates shall be large enough to completely close the hole around the pipes and shall be square, octagonal, or round, with the least dimension not less than 1½ inches larger than the diameter of the pipe. Plates shall be secured in an approced manner.

17-19 ELECTRICAL WORK: Motors, controls, and switching and protective devices required for the proper operation of the equipment shall be furnished under this section of the specifications and shall conform to ELECTRICAL WORK: Motor controllers and protective and signal devices for motor circuits shall be installed and connected under ELECTRICAL WORK, except where such apparatus is furnished mounted and connected integral with the motor-driven equipment. Final connections to electrical equipment, including motors, together with the installation and connections to all related control and protective equipment, shall be accomplished as a part of the electrical work under ELECTRICAL WORK. A complete electrical-connection diagram for each piece of mechanical equipment having more than one automatic or manual electrical control device shall be submitted to the Contracting Officer for approval.

17-20 PAINTING: Exterior surfaces of piping to be installed in or through concrete floor or tile floors shall be given one coat of acid-resisting paint having a bituminous base. Pipe hangers, supports, and other iron work concealed or in unfinished spaces shall be thoroughly cleaned and painted with one coat of black asphaltum varnish.

Finish painting of exposed pipe, pipe covering, hangers, supports, and other iron work shall conform to PAINTING, GENERAL

17-21 IDENTIFICATION OF PIPING: Service piles exposed or concealed in accessible pipe spaces shall be provided with color bands and legends adjancent to all valves except valves provided as shutoff valves on supply pipes for fixtures.

a. Color bands: The following color bands with legends in bold black letter shall be used.

| Piping | Band color | Band legend |
|---|---|---|
| Cold Water | White | C.W. |
| Hot Water | White | H.W. |

b. Size of stencil letters:

| Diameter of pipe (inches) | Size of stencil letters (inch) |
|---|---|
| 1/2 ..... | 3/8 |
| 3/4 ..... | 3/8 |
| 1 ..... | 1/2 |
| 1 1/4 ..... | 1/2 |
| 1 1/2 ..... | 3/4 |
| 2 ..... | 3/4 |

17-22 TYPES OF FIXTURES AND FIXTURE TRIMMINGS specified herein shall be furnished and installed complete with all trimmings and fittings, unless otherwise specified under the item. The item numbers correspond with the "P" numbers noted at the plumbing fixtures on the drawings.

a. General requirements: References made herein to outfit numbers and figure numbers of vitreous china and enameled cast-iron poumbing fixtures are to Federal Specification WW-P-541, unless otherwise indicated. Fixtures and trimmings not covered by Federal Specification WW-P-541 shall be considered special, but shall be of equal quality and material. Generally, all fixtures except water closets and urinals shall have the water supply above the rim. Fixtures with the supply discharge below the rim shall be equipped with backflow preventers. Angle stops, straight stops, stops integral with the faucets, or concealed type of lock-shield loose-key pattern stops for supplies shall be furnished and installed with fixtures. Exposed traps and supply pipes for all fixtures and equipment shall be connected to the rough piping systems at the wall unless otherwise specified under the item. Floor and wall plates and escutcheons shall be as specified hereinbefore or as covered by the outfit numbers. The exposed fixture trimming and fittings shall be chromium-plated on nickel-plated brass with polished bright furfaces conforming to Federal Specification WW-P-541.

b. Cross connections: Fixtures and trimmings shall be designed to prevent the backflow of polluted water or waste into the water-supply system.

c. Fixture connections: Where space conditions will not permit standard fittings in conjunction with the cast-iron floor flange, special short-radius fittings shall be provided. Connections between earthenware fixtures and flanges on soil pipe shall be made absolutely gastight and watertight with a closet-setting compound in accordance with Federal Specification HH-C-536, or with gaskets in accordance with Federal Specification HH-G-116. Rubber gaskets or putty will not be permitted for these connections. Bolts shall be not less than 1/4 inch in diameter and shall be equipped with chromium-plated nuts and washers. Fixture with outlet flange shall be set the proper distance from floor or wall to make a first-class joint with the closet-setting compound or gasket and fixture used; no fixture shall be set in place until the Contracting Officer has examined and approved such flange. Center line of fixtures shall be at 90°F and parallel to the lines of the building.

d. Flush valves shlal be of the non-hold-open type.

e. Fixtures furnished by contractor:

| | |
|---|---|
| P-1 Water close | - Outfit W 5 |
| P-2 Lavatory | - Outfit VL 20 F |
| P-3 Kitchen sink | - 2'-10¼"x2 -1" stainless steel counter top w/12"x10"x8" deep compartment. |
| P-4 Laundry tray | - Outfit MT 48 (w/legs) |

P-5 Shower - Outfit SDC
P-7 Urinal - Outfit VU 18 HF
Electrical water heater (as shown)

17-23 CONNECTIONS TO SEWER PIPE: The cast-iron building connection lines shall be extended to connection with the existing concrete sewer pipe. The section of the concrete pipe that is to be connected shall be replaced with a standard Wye coal-tar-coated concrete pipe, jointed with hot-pour bituminous sealer, class 1. The cast-iron pipe shall be furnished with a clean-out within 3 feet from the building line.

17-24 ROOF DRAINAGE: Plastic drain pipes shall be installed as indicated on the drawings, bonded and waterproofed at joint with roof slab with epoxy grout specified in section ROOFING & WATERPROOFING.

17-25 STORM DRAIN: Install a concrete catch basin at each roof drain as shown on the drawings. Catch basins shall be constructed of class B concrete with the reinforcement and the dimensions shown. The catch basins shall be connected to drain into existing concrete storm drainage trench through concrete drain pipes, jointed with cement mortar. Cast iron covers shall be supplied and installed at each catch basin.

17-26 INSPECTION AND TESTS:

a. Methods of sampling, inspection, and tests for fixtures shall conform to Federal Specification WW-P-541.

b. Tests for plumbing systems: Soil, waste, vent, air and water piping shall be tested by the contractor and approved before acceptance, Soil and waste piping located underground shall be tested before backfilling. Equipment required for test shall be furnished by the contractor without additional cost to the Government.

(1) Drainage and venting system: The piping of the drainage and venting system shall be tested with water or air before installing fixtures. After the plumbing fixtures have been set and their traps filled with water, the entire drainage and venting system shall be submitted to a final test with smoke or peppermint.

(a) Water test shall be applied to the drainage and venting system either in its entirety or in sections. If the test is applied to the entire system, all openings in the piping shall be tightly closed except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, such opening except the highest opening of the section under test shall be tightly plugged, and each section shall be filled with water and tested with at least a 10-foot head of water. In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested so that each joint or pipe in the building except the uppermost 10 feet of the system has been submitted to a test of at least a 10-foot head of water. The water shall be kept in the system, or in the portion under test, for at least 15 minutes before the inspection starts; the system shall then be tight at all joints.

(b) Air test: If tests are made with air, a pressure of not less than 5 pounds per square inch shall be applied with a force pump and maintained at least 15 minutes without leakage. A mercury-column gage shall be used in making the air test.

(c) Final test: When the smoke test is employed, the smoke shall be produced by a smoke machine, and a pressure equal to 1-inch water column shall be maintained for 15 minutes before starting inspection. When the peppermint test is preferred, 2 ounces of peppermint shall be introduced into each line or stack. Defects discovered shall be eliminated by resetting the fixtures and equipment with new gaskets.

(2) Water system: Upon completion of the roughing-in and before setting fixtures, the entire cold-water piping systems shall be tested at a hydrostatic pressure of not less than 100 pounds per square inch gage and the air tested at 150 pounds per square inch gage, and proved tight at this pressure for not less than 30 minutes in order to permit inspection of all joints. Where a portion of the piping system is to be concealed before completion, this portion shall be tested separately in a manner described for the entire system.

(3) Defective work: If inspection or test shows defects, such defective work or material shall be replaced and inspection and tests repeated. Reparis to piping shall be made with new material. No caulking of screwed joints or holes will be acceptable.

(4) Cleaning and adjusting: At the completion of the work, all parts of the installation shall be thoroughly cleaned. All equipment, pipe, valves, and fittings shall be cleaned of grease, metal cuttings, and sludge which may have accumulated by operation of the system for testing. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishings, due to the contractor's failure to properly clean the piping system, shall be repaired by the contractor without cost to the Government. Flush valves and other parts of the work shall be adjusted for quiet operation. Automatic control devices shall be adjusted for proper operation.

17-27 GUARANTY: Plumbing fixtures furnished under this section of the specifications shall be guaranteed for a period of 1 year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship. Upon receipt of notice from the Government of failure of any parts of the guaranteed equipment during the guaranty period, the affected part or parts shall be replaced promptly with new parts by and at the expense of the contractor.

# SECTION 18

## VENTILATING SYSTEM, MECHANICAL

18-01 SCOPE: This section covers a mechanical ventilating system, complete.

18-02 APPLICABLE PUBLICATIONS: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

| | |
|---|---|
| QQ-A-250/2b | Aluminum Alloy, 3003, Plate and Sheet. |
| QQ-S-698(1) | Steel, Sheet and Strip, Low-Carbon. |
| QQ-S-775c | Steel Sheets, Carbon, Zinc-Coated. |
| RR-W-360 | Wire Fabric, Industrial. |
| TT-V-51c | Varnish; Asphalt. |

b. Federal Standard:

| | |
|---|---|
| No. 141 & Change notice 1, 2 & 3. | Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing. |

c. Military Specifications:

| | |
|---|---|
| MIL-A-52174(Ord) | Aluminum Alloy Duct Sheet. |
| MIL-F-16081c | Fans, Ventilating, Propeller. |
| MIL-I-22023A & Int. Am-1 (Ships) | Insulation Felt, Thermal and Sound Absorbing Felt, Fibrous Glass, Flexible. |

d. Air Moving and Conditioning Association, Inc., Bulletin:

| | |
|---|---|
| 210 | Standards Test Code for Air Moving Devices (September 1960). |

e. American Society for Testing and Materials Standard:

| | |
|---|---|
| D 1571-58T | Woven Asbestos Cloth. |

18-03 GENERAL: The contract drawings indicate the extent and general arrangement of the ventilating system. The contractor shall be responsible for installing the proposed system as indicated, without violation of applicable codes, standards, or specification requirements. Except where dimensions are shown to locate ductwork or equipment, the drawings show duct size and

arrangement only. Equipment, ductwork, and piping arrangements submitted shall fit into the space as indicated, and shall allow adequate and approved clearances for entry, servicing, and maintenance.

a. Capacities of equipment items shall be not less than those indicated.

b. Conformance to agency requirements: Where materials or equipment are specified to conform to the requirements of the Underwriters' Laboratories, Inc., the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of or listing in the Underwriters' Laboratories, Inc. Publications will be acceptable as sufficient evidence that the items conform to such requirements. In lieu of such stamp, label, or listing, the Contractor may submit a written certificate from any nationally recognized testing agency in the United States of America adequately equipped and competent to perform such services, stating that the items have been tested and that the units conform to the requirements specified hereinbefore, including methods of testing of the specified agencies.

c. Standard products: Materials and equipment to be provided shall be the approved standard products of manufacturers regularly engaged in the manufacture of products conforming to these specifications.

d. Verification of conditions and dimensions: The Contractor shall be responsible for the coordination and proper relation of the work to the building structure and to the work of other trades. The Contractor shall visit the premises and thoroughly familiarize himself with pertinent details of the work and working conditions. Discrepancies shall be reported to the Contracting Officer before any work is started.

e. Certificates of origin: The contractor shall furnish certificates, in triplicate, signed by the contractor and an authorized officer of either the supplying company or manufacturing company, certifying that the material furnished under this section of the specifications is a product produced or manufactured in the United States or [redacted] 25X1A6a as defined in the clause of the SPECIAL CONDITIONS entitled, "USE OF UNITED 25X1A6a STATES [redacted] CONSTRUCTION MATERIAL".

18-04 MATERIAL AND EQUIPMENT APPROVAL: As soon as practicable, and before purchase of any materials or equipment, the Contractor shall submit for approval a complete list, in triplicate, of materials and equipment to be incorporated in the work. This list shall include catalog numbers, cuts, and other descriptive data required to assure compliance with the specification requirements. No consideration will be given to partial lists submitted from time to time. Approval of the proposed materials and equipment based on manufacturers' published data will be tentative only. Final approval will be based on compliance of the materials and equipment with the contract documents.

a. Aluminum sheets: Federal Specification QQ-A-250/2, H12 or H22

temper, or Military Specification MIL-A-52174.

b. Asbestos: ASTM Standard D 1571, grade A.

c. Asphalt varnish: Federal Specification TT-V-51.

d. Fibrous glass: Military Specification MIL-I-22023.

e. Iron and steel sheets, other than for register, grilles, certain indicated ducts and hoods, shall conform to Federal Specification QQ-S-775, type 1, class C, hot dipped galvanized. Steel sheets for registers and grilles shall conform to Federal Specification QQ-S-698, condition and finish standard with the manufacturer.

f. Wire screening:

(1) Bird screens: Federal Specification RR-W-360, type 1, class, I, two by two mesh per inch, 0.063-inch diameter wire, galvanized before-woven.

18-05 INSTALLATION DATA SHEETS: Before installation of these items, the Contractor shall submit installation drawings and such other descriptive data as required and directed to demonstrate compliance with the contract documents. Data sheets shall be submitted for the following items showing that the items have been properly coordinated and will fit into the spaces alletted:

Ceiling, & roof exhaust fans

18-06 WORKMANSHIP: All equipment shall be installed in accordance with the approved recommendations of the manufacturer to conform with the contractor documents. The installation shall be accomplished by workmen skilled in this type of work.

18-07 FANS: Ceiling and roof exhaust fans shall be the types indicated on the drawings. Ducts, grilles and weathertight housing shall be provided as approved. Housing shall be rigidly constructed to withstand a wind pressure of 65 pounds per square foot. Bird screens conforming to Federal Specification RR-W-360, type 1, class I, 2x2 mesh per inch, 0.063-inch diameter wire, galvanized before-woven shall be provided for each fan housing.

18-08 DUCT WORK:

a. General: Ducts shall be fabricated of sheet

metal. Sheet metalwork indicated, specified, or required for ventilating the building shall be erected in a first-class workmanlike manner, and shall be approved by the Contracting Officer. Ducts, unless otherwise approved, shall be true to the dimensions indicated and straight and smooth on the inside, with neatly finished joints. The ducts shall be securely anchored to the building in an approved manner, and shall be so installed as to be completely free from vibration under all conditions of operation. Exact routing of the ductwork will be dependent on the location of framing members, and the contractor shall be responsible for so routing the duct as to avoid these framing members. The ducts shall be properly braced and reinforced with hot-dip galvanized steel angles or other approved structural members spaced not more than 60 inches on centers. Slip joints shall be made in the direction of flow, and unless otherwise indicated, elbows shall have a centerline radius not less than 1½ times the width of the duct. The sheet metal used shall be hot-dipped galvanized steel, conforming to Federal Specification QQ-S-775, or aluminum conforming to Federal Specification QQ-A-359 or Military Specification MIL-A-52174. The thickness of the sheet metal, and the size and spacing of the stiffeners used shall conform to table 1.

Table 1 - Sheet-metal gages for rectangular-duct construction

| Thickness in. (gage) Aluminum (B&S) | Steel (USS) | Max. side, inches | Type transverse Joint connections[a] | Bracing |
|---|---|---|---|---|
| .0201 (24) | .0179 (25) | Up thru 12 | S, drive, pocket, or bar slips on 7-ft. 10-in. centers | None |

[a] Other joint connections of equivalent mechanical strength and air-tightness may be used.

a. Duct sleeves shall be fabricated from 22-gage galvanized sheet steel unless otherwise indicated. Duct installation and vapor barrier shall extend through the duct sleeve. Sleeve shall be 2 inch larger than duct unless otherwise required by the thickness of the insulation used. Opening or sleeve shall be packed with commercial-grade twisted asbestos rope.

b. Duct supports shall consist of not less than 1 inch by 1/16 inch galvanized strap-iron hangers spaced not over 4 feet on centers.

18-09 REGISTERS AND GRILLES: Grilles for ceiling exhaust fans shall be the manufacturer's standard product of stainless steel and shall be furnished with the fan unit. Ceiling exhaust grilles for power roof exhausters shall be air-conditioning type and shall have overall dimensions and net free areas as indicated.

18-10 ELECTRICAL WORK: Electric motor-driven equipment specified herein shall be provided complete with motor and motor starter. Electrical equipment and wiring shall conform to SECTION: ELECTRICAL WORK, INTERIOR. Electrical characteristics shall be as indicated. Motors shall be of sufficient capacity to drive the driven equipment at the specified capacity including an allowable service factor, without exceeding the nameplate rating on the motor. Manual or automatic control and protective or signal devices required for operation herein specified and any wiring required but not indicated on the electrical drawings shall be proveded under this section of the specifications and shall conform to the applicable requirements of SECTION: ELECTRICAL WORK.

18-11 PAINTING AND FINISHING: Duct hangers and other specified and unprotected ferrous metal external to finished rooms shall be thoroughly cleaned and given one coat of asphalt varnish. The painting of fan units, roof ventilators, grilles, registers, and ferrous metal work exposed within finished rooms, and fans, housings, and equipment external to finished rooms is specified in SECTION: PAINTING: GENERAL. Except where provided with a protective primer at the factory, ferrous metal specified to receive finish painting shall receive a prime coat as specified in SECTION: PAINTING; GENERAL.

18-12 OPERATION AND MAINTENANCE INSTRUCTIONS, in printed form, for each item of equipment, shall be posted at locations designated by the Contracting Officer. Upon completion of the work, and at a time designated by the Contracting Officer, a competent engineer shall be provided by the contractor for a period of not less than 1 day to instruct a representative of the Government in the operation and maintenance of the mechanical ventilating system.

18-13 TESTS: Each supply and exhaust-air system shall be balanced to produce the indicated air quantities at the conditions shown. Control devices shall be set to control at the points indicated or directed. Bearings shall be lubricated, and the speed and direction of rotation of each fan shall be checked. The running current of each motors shall be checked.

a. Report of test data indicating the following in typed tabulated form shall be submitted to the Contracting Officer not less than 2 days before the final test of the system:

(1) Fans:

(a) Specified air quantity and static pressure.

(b) Installed motor horsepower.

(2) Air inlets:

(a) Specified size and air quantity.

(b) Installed size.

(c) Measured air velocity.

(d) Computed air quantity.

(3) Controls: The setting of each automatic or safety control shall be included in the test report.

b. Final tests: Upon completion, and prior to acceptance of the installation, the contractor shall subject the ventilating system to such operating tests as may be required by the Contracting Officer to demonstrate satisfactory functional and operating efficiency. Operating tests shall cover a period of not less than 6 hours for each system, and all tests shall be conducted at such times as the Contracting Officer may direct. If tests do not demonstrate satisfactory operation of the ventilating systme, deficiencies shall be corrected to the satisfaction of the Contracting Officer. All instruments, facilities, and labor required to properly conduct the tests shall be provided by the contractor at no additional cost to the Government. The electricity required for testing will be furnished by the Government.

18-14 GUARANTY: The following equipment to be furnished under this section of the specifications shall be guaranteed for a period of 1 year from the date of acceptance thereof, either for beneficial use of final acceptance, whichever is earlier, against defective materials, design, and workmanship:

Ceiling and roof exhaust fans.

Upon receipt of notice from the Government of failure of any part of the guaranteed equipment during the guaranty period, the affected part or parts shall be replaced promptly with new parts by and at the expense of the contractor.

# SECTION 19

## ELECTRICAL WORK

19-01 SCOPE: The work covered by this section of the specification consists in furnishing all labor, equipment, supplies, and materials, not furnished by the Government, and in performing all operations including cutting, channeling, and chasing, necessary for the installation of complete interior wiring systems and electrical equipment, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

19-02 APPLICABLE SPECIFICATIONS AND STANDARDS: The following specifications and standards form a part of these specifications:

a. Federal Specifications:

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| J-C-129c (2) | Cable and Wire: Thermoplastic-Insulated, General Purpose (0 to 600-Volt Service). |
| W-C-375a (2) & Int. Am. 2 | Circuit Breaker, Molded Case; Branch Circuit and Service. |
| W-C-586a | Conduit Outlets and Entrance Caps, Electrical; cast Metal--for Shore Use. |
| E-C-596a | Connector, plug, Electrical; Connector, Receptacle, Electrical. |
| W-F-406b | Fittings for Cable, and Power, Electrical Conduit, Metal, Flexible. |
| W-F-408a | Fittings for Conduit, Metal, Rigid (Rigid Steel and Electrical Metallic Tubing). |
| W-F-412c | Fixture, Lighting, Incandescent Lamp, Insustrial. |
| W-F-791d | Fuse, Cartridge and Fuse, Plug. |
| W-H-196d | Heater, Electric; Water, Storage, Domestic. |
| W-J-800c (1) | Junction Box; Extension, Junction Box; Cover, Junction Box (Steel, Cadmium or Zinc Coated). |
| W-L-101f (3) & 1963 Supp. | Lamp, Incandescent, (Electric, Large, Tungsten-Filament). |
| W-L-142a | Lampholder, Adapter, and Shadeholder, Medium-Screw-Shell, 125, 250, and 600 Volts. |
| W-P-115a & Int. Am. 1 | Panel, Power Distribution. |
| W-S-610b | Splice, Conductor. |
| W-S-865c (1) | Switch, Box (Enclosed), Surface-Mounted. |
| W-S-893a | Switch, Toggle, and Mounting Strap, (Interchangeable). |
| W-S-896c (1) | Switch; Toggle. |
| CC-M-636c | Motor, Alternating-current. (Fractional Horsepower) |
| HH-I-510a | Insulation Tape, Electrical, Friction. |
| HH-I-553 | Insulation Tape, Electrical, (Rubber, Natural and Synthetic). |

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|---|---|
| WW-C-566b | Conduit, Metal, Flexible. |
| WW-C-581d(3) | Conduit, Metal, Rigid; and Coupling, Elbow and Nipple, Electrical Conduit: Zinc-Coated. |

b. Underwriters' Laboratories, Inc.:

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|---|---|
| UL-50 | Standard for Cabinets and Boxes. Current Issue. |
| UL-869 | Standard for Service Equipment. Current Issue. |

c. National Board of Fire Underwriters Pamphlet:

No. 70, National Electrical Code, Standard for Electric Wiring and Apparatus. Current Issue.

d. National Electrical Manufacturers Association Standards:

| | |
|---|---|
| AB-1 | Circuit Breakers, Molded Case. |
| KS-1 | Enclosed Switches. |

e. Military Specification:

| | |
|---|---|
| MIL-I-7798A & Am-1 | Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic. |

19-03 GENERAL: The installations shall comply with the latest applicable rules of the National Electric Code and the workmanship shall be of the highest grade. Electrical materials shall be new and approved by the Underwriters Laboratories, Inc., wherever standards have been established by that agency. In lieu of the Underwriters' Laboratories, Inc., approval consideration will be given to certified test reports of an adequately equipped recognized independent testing laboratory competent to perform such testing indicating conformance to all requirements of the applicable Underwriters' Laboratories, Inc., standard. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting with the approval of the Contracting Officer. The contract drawings indicate the extent and general arrangement of the conduit, wiring systems and the electrical distribution systems. If any departures from the contract drawings are deemed necessary by the Contractor, details of such departures and the reasons therefor shall be submitted as soon as practicable, and within 30 days after award of the contract, to the Contracting Officer for approval. No such departures shall be made without the prior written approval of the Contracting Officer.

a. Standard products: Unless otherwise indicated in writing by the Contracting Officer the materials to be furnished under this specifications shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design that complies with the specification requirements.

b. Materials and equipment schedules: As soon as practicable and within 30 days after the date of notice to proceed and before commencement of installation of any materials or equipment, the Contractor shall submit to the Contracting Officer for approval a complete list, in triplicate, of Contractor-furnished materials, fixtures, and equipment to be incorporated in the work. The list shall include catalog numbers, cuts, diagrams, drawings, and such other descriptive data as may be required by the Contracting Officer. No consideration will be given to partial lists submitted from time to time. Approval of materials will be based on manufacturer's published ratings. Any materials, fixtures, and equipment listed which are not in accordance with the specification requirements may be rejected.

c. Options of the Government: If the Contractor fails to submit for approval within the specified time or any authorized extension thereof a list of materials, fixtures, and equipment in accordance with the preceding paragraph, the Contracting Officer will select a complete line of materials, fixtures and equipment. The selection thus made by the Contracting Officer shall be final and binding, and the items shall be furnished and installed by the contractor without change in contract price or time of completion.

19-04 GROUNDING: The conduit systems, and neutral conductor of the wiring system shall be grounded. The ground connection of the electric system neutral and conduit system shall be made through the existing main service equipments.

19-05 WIRING: Conductor sizes shall be not less than those shown on the drawings. Branch-circuit conductors shall be not smaller than No. 12 AWG except that for circuits of more than 100 feet from panel to load No; 10 AWG shall be used. Conductors shall be continuous from outlet to outlet, and no splices shall be made except within outlet or junction boxes. Junction boxes may be utilized where required. Wire connectors of insulating material or solderless pressure connectors, properly taped, shall be utilized for all splices in wiring where possible. Solderless pressure connectors shall conform to Federal Specification W-S-610. Soldered joints insulated with tape shall be kept to a minimum. Rubber and friction tape shall conform to the requirements of Federal Specifications HH-I-510 and HH-I-553 respectively. Vinyl plastic tape of suitable quality conforming to Military Specification MIL-I-7798 is acceptable in lieu of rubber and friction tapes.

a. Conduit system: Conduit system shall be installed in accordance with article 346 of the National Electrical Code. Rigid steel conduit shall be zinc-coated and shall conform to the requirements of Federal Specification WW-C-581. Conduit fittings shall conform to the requirements of Federal Specification W-F-406 and W-F-408. Conduit shall be of ½ inch minimum size.

(1) Installations: Conduits shall be concealed within finished walls, ceilings, and floors, where possible, and shall be kept at least 6 inches away from parallel runs of hot-water pipes. Exposed runs of conduit shall have supports spaced not more than 5 feet apart and shall be installed with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings. Field-made bends and offsets shall be avoided where possible, but where necessary shall be made with an approved hickey or conduit-bending machines. Changes in direction of runs shall be made with symmetrical bends or cast-metal fittings conforming to Federal Specification W-C-586. Crushed or deformed conduits shall not be installed. Trapped conduits shall be avoided where possible. Care shall be taken to prevent the lodgement of plaster, dirt, or trash in conduits, boxes, fittings, and equipment during the course of construction. Clogged conduit shall be entirely freed of obstruction or shall be replaced. Conduits shall be fastened to all sheet-metal boxes and cabinets with two locknuts where required by the National Electrical Code, where insulating bushings are used, and where bushings cannot be brought into firm contact with box; otherwise a single locknut and bushing are acceptable. Bushings shall be installed in the ends of all conduits and shall be of the insulating type where required by the National Electrical Code. Conduits crossing expansion joints in concrete slabs shall be provided with suitable expansion fittings, or other suitable means shall be provided to compensate for the building expansion and contraction. Wooden plugs inserted in masonry or concrete shall not be used as a base to secure conduit supports. Conduit shall be supported on approved type of galvanized wall brackets, ceiling trapeze, strap hangers, or pipe straps, secured by means of toggle bolts on hollow masonry units, expansion bolts in concrete or brick, wood screws on wood construction, and machine screws of welded threaded studs on steel work. Threaded studs driven in by a powder charge and provided with lock washers and nuts are acceptable in lieu of expansion bolts or machine or wood screws. Nails shall not be used as the means of fastening boxes or conduits.

(2) Conductors: A complete system of conductors shall be installed in the conduit systems. Unless otherwise indicated conductors in branch circuit conduit shall be thermoplastic-insulated conducter type TW conforming to Federal Specification J-C-129a. Type THW conductors shall be used where indicated on the drawing or where required for current carrying capacity and shall conform to Federal Specification and Standard of the Underwriters' Laboratories Inc.

19-06 OUTLETS: Each outlet in the wiring system shall be provided with an outlet box to suit the conditions encountered. Boxes installed where they are exposed to the weather or in normally wet locations shall be of the cast-metal type having threaded hubs conforming to Federal Specification W-C-586. Boxes in other areas shall be of the cadmium plated or zinc-coated sheet-metal type conforming to Federal Specification W-J-800. Each box shall have sufficient vloume to accommodate the number of conductors entering box in accordance with the requirements of the National Electrical Code. Boxes shall be not less than 1½ inches deep unless shallower boxes are

required by structural conditions and are specifically approved by the Contracting Officer. Ceiling and bracket outlet boxes shall not be less than 4-inch octagonal except that smaller boxes may be used where required by the particular fixture to be installed. Flush or recessed fixtures shall be provided with separated junction boxes when required by the fixture terminal temperature requirements. Switch and receptacle boxes shall be approximately 4 inches by 2 inches (except that 3-inch by 2-inch boxes may be used in cable systems). Boxes installed in concealed locations shall be set flush with the finished surfaces and shall be provided with the proper type extension rings or plaster covers where required. Boxes shall be installed in a rigid and satisfactory manner and shall be supported by bar hangers in frame construction or shall be fastened directly with wood screws on wood, bolts and expansion shields on concrete or brick, toggle bolts on hollow masonry units, and machine screws or welded threaded studs on steel work. Threaded studs driven in by a powder charge and provided with lock washers and nuts are acceptable in lieu of wood screws, expansion shields, or machine screws. Location of outlets shown on the drawings is approximate; the contractor shall sutdy the building plans in relation to the spaces and equipment surrounding each outlet so that the lighting fixtures are symmetrically located according to the room layout. When necessary, with approval of the Contracting Officer, outlets shall be relocated to avoid interference with mechanical equipment or structural features.

a. Junction boxes shall be constructed of code-gage galvanized sheet-metal, of not less than the minimum size required of the National Electrical Code except as otherwise indicated. Metal boxes shall be furnished with screw-fastened covers. Weatherproof type junction boxes shall be of cast metal and provided with weatherproof gasketed cover.

19-07 DEVICE PLATES of the one piece-type shall be provided for all outlets to suit the device installed. Plates on unfinished walls or fittings shall be of zinc-coated sheet metal having rounded or beveled edges. Plates on finished walls shall be of stainless steel, or brass 0.040 inch thick, provided with beveled edges. Brass plate shall be chromium plated with satin finish. Screws shall be of stainless steel or brass with countersunk heads, with finish to match the finish of the plate. Plates shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed vertically and with alinement tolerance of 1/16-inch. The use of sectional device plates will not be permitted.

19-08 RECEPTACLES: Receptacles shall conform to the requirements of Federal Specification W-C-596.

a. Duplex receptacles shall be rated 15 amperes, 125 Volts two-pole, three-wire, grounded type. Bodies shall be of brown phenolic compound supported by mounting yoke having plaster ears. Contact arrangement shall be such that contact is made on two sides of an inserted blade. Receptacles shall be side- or back-wired with two screws per terminal, or shall have pressure-type screwless terminals haveing suitable conductor release arrangement.

b. Special-purpose or heavy-duty receptacles shall be of the type and ratings and number of poles indicated on the drawing or required for the anticipated purpose. Contact surfaces may be either round or rectangular. One appropriate straight or angle-type plugshall be furnished with each receptacle. Locking facilities, where required, shall be accomplished by the rotation of the plug.

19-09 WALL SWITCHES: Wall switches shall be of the totally enclosed tumbler type conforming to Federal Specifications W-S-896 or W-S-893 as applicable. Bodies shall be phenolic compound. Wiring terminals shall be of the screw type or of the solderless pressure type having suitable conductor-release arrangement. Not more than two (2) switches shall be installed in a single-gang position. Switches shall be rated 15-ampere 120-volt for use on alternating current only.

19-10 PANELBOARDS shall be of the dead-front safety type provided with the size and number of single - souble -, or triple-pole branches as indicated.

a. Circuit-breakers conforming to Federal Specification W-C-375 shall be installed. Circuit breakers shall conform to class A requirements. Two single-pole circuit breakers with tie or bail or equivalint constructions are not acceptable for a double-pole breaker. Plug -in type circuit breakers are not acceptable.

19-11 MOTOR-DISCONNECT MEANS: Each motor shall be provided with a disconnecting means when required by the National Electrical Code even though not indicated on the drawings. For single-phase motors, a single- or double pole tumbler or snap switch, rated only for alternating current, shall be acceptable for capacities less than 30 amperes, provided the ampere rating of the switch is at least 125% of the rating of the controlled equipment.

19-12 EQUIPMENT CONNECTIONS: All wiring for the connection of motors and control equipment as indicated on the electrical drawings shall be furnished and installed under this section of the specifications.

a. Government furnished equipment installed under other sections of the specifications shall have wiring extended to the equipment and proper connections made thereto.

b. Flexible connections of short length shall be provided for all motors and equipment subject to vibration or movement. Flexible steel conduit shall conform to Federal Specification WW-C-566.

19-13 LIGHTING FIXTURES: Lighting fixtures shall be complete, including lamps.

a. Unless otherwise specifically indicated on the drawings, the exact location and height of fixtures shall be determined by the structural and mechanical limitations of the building, and fixtures shall be installed in such a manner as to avoid such obstructions and to give the proper illumination results.

b. Lamps of the proper type, wattage and voltage rating shall be furnished and installed in each fixture.

(1) Incandescent lamps shall conform to Federal Specification W-L-101 and the 1963 supplement. They shall be for 120-volt operation unless otherwise specified.

(2) Lamps shall be delivered to the project in their original cartons and installed in the fixtures just prior to the completion of the project.

c. Lighting fixture schedule: Fixtures shall conform to the general details as specified on drawings. Illustrations shown are indicative of the general type desired and are not intended to restrict selection to fixtures of any particular manufacturer. Fixtures of similar designs and equivalent light-distribution and brightness characteristics, and of equal finishand quality will be acceptable if approved by the Contracting Officer.

(1) Accessories, such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.

(2) Medium-screw-base socket shall conform to Federal Specification W-F-412.

19-14 CLOSET HEATERS shall be installed in closets or cabinets where indicated. Heaters shall be of the resistor type, rated as indicated and suitable for operation at 120 volts. The heating element shall be completely enclosed by a perforated metal guard. The closet heater shall consist of a resistor with medium screw base porcelain receptacle and separate perforated metal guard in which case the guard shall be secured to wall or outlet box and provision shall be made for replacing the resistor unit with outremoving the guard assembly.

19-15 ELECTRICAL WATER HEATERS shall conform to F.S. W-H-196. Size, capacity, voltage and combined wattage of the heating element shall be as indicated.

19-16 REPAIR OF EXISTING WORK: The work shall be carefully laid out in advance, and where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for the proper installation support, or anchorage of the conduit, raceways, or other electrical work, this work shall be carefully done, and any damage to buildings, piping or equipment shall be repaired by skilled mechanics of the trades involved, at no additional cost to the Government.

19-17 TESTS: After the interior and exterior installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this specification. The test shall be performed in the presence of the Contracting Officer or his authorized representative. The Contractor shall furnish all instruments and personnel required for the tests, and the Government will furnish the necessary electric power.

19-18 GUARANTY: All equipment to be furnished by the Contractor under this section of the specification shall be guaranteed for a period of one year after the date of final acceptance thereof against defective design, materials and workmanship. Upon receipt of notice from the Government of failure of any part of the guaranteed equipment during the guaranty period owing to the above causes, the affected part or parts shall be promptly replaced with new parts by and at the expense of the Contractor.

# I N D E X

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